40MBC/40MBD/40MBF/38MAQ/38MBQ
619RC/619RD/619RF/538PR/538RR
Cassette, Ducted, Floor Console Single Zone Ductless Split System
Sizes 09 to 48

Service Manual

TABLE OF CONTENTS

SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.).

Only trained, qualified installers and service mechanics should install, start-up, and service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel.

When working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment.

Follow all safety codes. Wear safety glasses and work gloves. Keep quenching cloth and fire extinguisher nearby when brazing. Use care in handling, rigging, and setting bulky equipment.

Read this manual thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: DANGER, WARNING, and CAUTION.

These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, the main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

⚠ WARNING

EXPLOSION HAZARD

Failure to follow this warning could result in death, serious personal injury, and/or property damage.

Never use air or gases containing oxygen for leak testing or operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

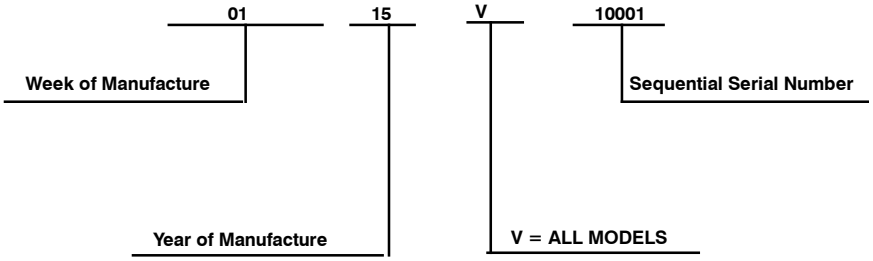
Failure to follow this caution may result in equipment damage or improper operation.

Do not bury more than 36 in. (914 mm) of refrigerant pipe in the ground. If any section of pipe is buried, there must be a 6 in. (152 mm) vertical rise to the valve connections on the outdoor units. If more than the recommended length is buried, refrigerant may migrate to the cooler buried section during extended periods of system shutdown. This causes refrigerant slugging and could possibly damage the compressor at start-up.

INTRODUCTION

This Service Manual provides the necessary information to service, repair, and maintain the family of heat pumps. Section 2 of this manual has an appendix with data required to perform troubleshooting. Use the Table of Contents to locate a desired topic.

SERIAL NUMBER NOMENCLATURES



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program For verification of certification for individual products, go to www.ahridirectory.org.

STANDARD FEATURES AND ACCESSORIES

Ease Of Installation	
Mounting Brackets	S
Low Voltage Controls	S
Comfort Features	
Microprocessor Controls	S
Wired Remote Control	A
Wireless Remote Control	S
Automatic Horizontal Air Sweep	S
Air Direction Control	S
Auto Restart Function	S
Cold Blow Protection On Heat Pumps	S
Freeze Protection Mode On Heat Pumps	S
Turbo Mode	S
Silence Mode	S
Auto Changeover On Heat Pumps	S
Follow Me	S
Energy Saving Features	
Sleep Mode	S
Stop/Start Timer	S
46° F Heating Mode (Heating Setback)	S
Safety And Reliability	
3 Minute Time Delay For Compressor	S
Over Current Protection For Compressor	S
Indoor Coil Freeze Protection	S
Indoor Coil High Temp Protection in Heating Mode	S
Condenser High Temp Protection in Cooling Mode	S
Ease Of Service And Maintenance	
Cleanable Filters	S
Diagnostics	S
Liquid Line Pressure Taps	S
Application Flexibility	
Condensate Pumps	A
Crankcase Heater	S
Base pan Heater	S

Legend
S Standard
A Accessory

INDOOR UNITS ACCESSORIES

Grille:

To maximize shipping efficiency, the grille for the in-ceiling cassette is set up as an accessory.

NOTE: Grille is required.

OUTDOOR UNITS

Crankcase Heater

Standard on all unit sizes. Heater clamps around compressor oil stump.

SPECIFICATIONS - CASSETTE HEAT PUMP

Table 1—Cassette Specifications

	Size		9	12	18
System	Outdoor Model		38MAQB09---3 538PEQ009RBMA	38MAQB12---3 538PEQ012RBMA	38MAQB18---3 538PEQ018RBMA
	Indoor Model		40MBQB09C--3 619REQ009CBMA	40MBQB12C--3 619REQ012CBMA	40MBQB18C--3 619REQ018CBMA
Performance	Cooling Rated Capacity	Btu/h	9,000	12,000	16,000
	Cooling Cap. Range Min - Max	Btu/h	3,500~11,000	4,000~13000	4,500~18,000
	SEER		19.0	20.5	19.0
	EER		13.0	13.0	12.5
	Heating Rated Capacity	Btu/h	10,000	12,000	18,000
	Heating Cap. Range Min - Max	Btu/h	4,500~11,500	5,000~13500	5,500~19,000
	HSPF		10.0	10.0	9.0
Controls	Wireless Remote Controller (F/C Convertible)		Standard		
	Wired Remote Controller (F/C Convertible)		Optional		
Operating Range	Cooling Outdoor DB Min - Max	°F	-4~122	-4~122	-4~122
	Heating Outdoor DB Min - Max	°F	-4~86	-4~86	-4~86
Piping	Total Piping Length	Ft.	82	82	98
	Piping Lift*	Ft.	32	32	65
	Pipe Connection Size - Liquid	In.	1/4	1/4	1/4
	Pipe Connection Size - Suction	In.	3/8	1/2	1/2
Refrigerant	Type		R410A		
	Design Pressure	PSIG	550	550	550
	Metering Device		Capillary Tube in Outdoor Unit		
	Charge	Lbs.	2.76	2.76	4.19
Outdoor coil	Face Area	Sq. Ft.	9.2	9.2	16.0
	No. Rows		2	2	2
	Fins per inch		21	21	18
	Circuits		4	4	6
Indoor Coil	Face Area	Sq. Ft.	3.1	3.1	3.1
	No. Rows		1	2	2
	Fins per inch		19	19	19
	Circuits		2	4	4
Compressor	Type		Hermetic Rotary DC Inverter Compressor		
	Model		ASM98D1UFZA	ASM108D1UFZA	ASM135D23UFZ
	Oil Type		VG74	VG74	VG74
	Oil Charge	Fl. Oz.	12.5	12.5	15.2
	Rated Current	RLA	5.3	5.7	7.3
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60	208/230-1-60	208/230-1-60
	Power Supply		Indoor unit powered from outdoor unit		
	MCA	A.	15	15	15
	MOCP - Fuse Rating	A.	15	15	20
Outdoor	Unit Width	In.	31.9	31.9	33.3
	Unit Height	In.	22.0	22.0	27.6
	Unit Depth	In.	12.2	12.2	12.6
	Net Weight	Lbs.	82.5	82.5	102.5
	Airflow	CFM	945	945	1050
	Sound Pressure	dB(A)	56	56	59
Indoor	Body Unit Width	In.	22.4	22.4	22.4
	Body Unit Height	In.	10.2	10.2	10.2
	Body Unit Depth	In.	22.4	22.4	22.4
	Body Net Weight	Lbs.	35.3	35.3	39.7
	Panel Unit Width	In.	25.5	25.5	25.5
	Panel Unit Height	In.	2.0	2.0	2.0
	Panel Unit Depth	In.	25.5	25.5	25.5
	Panel Net Weight	Lbs.	5.5	5.5	5.5
	Number of Fan Speeds		3	3	3
	Airflow (lowest to highest)	CFM	260/320/380	280/340/400	290/350/420
	Sound Pressure (lowest to highest)	dB(A)	34/39/44	36/39/42	46/48/50

* Condensing unit above or below indoor unit

SPECIFICATIONS - DUCTED HEAT PUMP (CONTINUED)

Table 2—Ducted Specifications

	Size		9	12	18	24	36	48
System	Outdoor Model		38MAQB09---3 538PEQ009RBMA	38MAQB12---3 538PEQ012RBMA	38MAQB18---3 538PEQ018RBMA	38MAQB24---3 538PEQ024RBMA	38MBQB36---3 538REQ036RBMA	38MBQB48---3 538REQ048RBMA
	Indoor Model		40MBQB09D--3 619REQ009DBMA	40MBQB12D--3 619REQ012DBMA	40MBQB18D--3 619REQ018DBMA	40MBQB24D--3 619REQ024DBMA	40MBQB36D--3 619REQ036DBMA	40MBQB48D--3 619REQ048DBMA
Performance	Cooling Rated Capacity	Btu/h	9,000	11,000	16,000	23,000	36,000	48,000
	Cooling Cap. Range Min - Max	Btu/h	3,500~11,000	4,000~13,000	4,500~18,000	5,500~24,500	8,500~38,000	9,000~50,000
	SEER		19.0	18.0	18.5	19.0	15.5	16.5
	EER		13.5	12.5	12.5	12.5	8.5	8.2
	Heating Rated Capacity	Btu/h	10,000	11,600	18,000	24,400	38,000	50,000
	Heating Cap. Range Min - Max	Btu/h	4,500~11,500	5,000~13,500	5,500~19,000	6,000~26,000	9,500~50,000	10,000~55,000
	HSPF		10.0	10.0	9.6	10.5	10.5	10.0
Controls	Wireless Remote Controller (F/ C Convertible)		Standard					
	Wired Remote Controller (F/ C Convertible)		Standard					
Operating Range	Cooling Outdoor DB Min - Max	°F	-4~122					
	Heating Outdoor DB Min - Max	°F	-4~86					
Piping	Total Piping Length	Ft.	82	82	98	98	213	213
	Piping Lift*	Ft.	32	32	65	65	98	98
	Pipe Connection Size - Liquid	In.	1/4	1/4	1/4	3/8	3/8	3/8
	Pipe Connection Size - Suction	In.	3/8	1/2	1/2	5/8	5/8	5/8
Refrigerant	Type		R410A					
	Design Pressure	PSIG	550	550	550	550	550	550
	Metering Device		Electric Expansion Valve			Capillary Tubes	Electric Expansion Valve	
	Charge	Lbs.	2.76	2.76	4.19	5.18	7.5	9.48
Outdoor Coil	Face Area	Sq. Ft.	9.2	9.2	16.0	21.1	8.2	14.1
	No. Rows		2	2	2	3	2.6	2.0
	Fins per inch		21	21	18	18	17	17.0
	Circuits		4	4	6	8	6	10.0
Indoor Coil	Face Area	Sq. Ft.	1.4	1.4	1.4	2.0	3.5	4.2
	No. Rows		3	3	3	4	4	4
	Fins per inch		16	16	16	16	16	16
	Circuits		4	4	4	6	8	8
Compressor	Type		Hermetic Rotary DC Inverter Compressor					
	Model		ASM98D1UFZA	ASM108D1UFZA	ASM135D23UFZ	DA250S2C-30MT	TNB306FPGMC-L	MNB36FAAMC-L
	Oil Type		VG74	VG74	VG74	VG74	FV50S	FV50S
	Oil Charge	Fl. Oz.	12.5	12.5	15.2	27.7	36.2	47.3
	Rated Current	RLA	5.3	5.7	7.3	8.8	13.5	13.5
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60	208/230-1-60	208/230-1-60	208/230-1-60	208/230-1-60	208/230-1-60
	Power Supply		Indoor unit powered from outdoor unit					
	MCA	A.	15	15	15	15	30	35
	MOCP - Fuse Rating	A.	15	15	20	25	50	55
Outdoor	Unit Width	In.	31.9	31.9	33.3	37.2	37.2	36.9
	Unit Height	In.	22.0	22.0	27.6	31.9	31.9	53.9
	Unit Depth	In.	12.2	12.2	12.6	15.6	15.6	15.4
	Net Weight	Lbs.	82.4	82.4	120.5	134.0	160.9	220.0
	Airflow	CFM	945	945	1050	1390	2940	4240
	Sound Pressure	dB(A)	56	56	59	62	65	65
Indoor	Unit Width	In.	27.6	27.6	36.2	36.2	44.9	47.2
	Unit Height	In.	8.3	8.3	8.3	10.6	10.6	11.8
	Unit Depth	In.	25.0	25.0	25.0	25.0	30.5	34.1
	Net Weight	Lbs.	39.9	39.9	50.7	57.3	77.2	99.2
	Number of Fan Speeds		3	3	3	3	3	3
	Airflow (lowest to highest)	CFM	290/340/380	290/340/380	400/440/480	590/650/810	680/940/1180	940/1180/1470
	Sound Pressure (lowest to highest)	dB(A)	30/33/36	30/34/38	34/37/38	43/45/48	46/50/52	41/44/46
	Max Static Pressure	In.WG.	0.18	0.18	0.40	0.40	0.40	0.40

* Condensing unit above or below indoor unit

SPECIFICATIONS - FLOOR CONSOLE HEAT PUMP (CONTINUED)

Table 3—Floor Console Specifications

	Size		9	12
System	Outdoor Model		38MAQB09---3 538PEQ009RBMA	38MAQB12---3 538PEQ012RBMA
	Indoor Model		40MBQB09F--3 619REQ009FBMA	40MBQB12F--3 619REQ012FBMA
Performance	Cooling Rated Capacity	Btu/h	9,000	12,000
	Cooling Cap. Range Min - Max	Btu/h	3,500~11,000	4,000~13,000
	SEER		20.0	20.5
	EER		12.5	12.5
	Heating Rated Capacity	Btu/h	10,000	12,000
	Heating Cap. Range Min - Max	Btu/h	4,500~11,500	5,000~13,500
	HSPF		10	10
Controls	Wireless Remote Controller (°F/°C Convertible)		Standard	
	Wired Remote Controller (°F/°C Convertible)		Optional	
Operating Range	Cooling Outdoor DB Min - Max	°F	-4~122	
	Heating Outdoor DB Min - Max	°F	-4~86	
Piping	Total Piping Length	Ft.	82	82
	Piping Lift*	Ft.	32	32
	Pipe Connection Size - Liquid	In.	1/4	1/4
	Pipe Connection Size - Suction	In.	3/8	1/2
Refrigerant	Type		R410A	
	Design Pressure	PSIG	550	550
	Metering Device		Electronic Expansion Valve	
	Charge	Lb.	2.76	2.76
Outdoor Coil	Face Area	Sq. Ft.	9.2	9.2
	No. Rows		2	2
	Fins per inch		21	21
	Circuits		4	4
Indoor Coil	Face Area (sq. ft.)	Sq. Ft.	2.1	2.1
	No. Rows		2	2
	Fins per inch		19	19
	Circuits		2	2
Compressor	Type		Hermetic Rotary DC Inverter Compressor	
	Model		ASM98D1UFZA	ASM108D1UFZA
	Oil Type		VG74	VG74
	Oil Charge	Fl. Oz.	12.5	12.5
	Rated Current	RLA	5.3	5.7
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60	208/230-1-60
	Power Supply		Indoor unit powered from outdoor unit	
	MCA	A.	15	15
	MOCP - Fuse Rating	A.	15	15
Outdoor	Unit Width	In.	31.9	31.9
	Unit Height	In.	22.0	22.0
	Unit Depth	In.	12.2	12.2
	Net Weight	Lbs.	82.5	82.5
	Airflow	CFM	945	945
	Sound Pressure	dB(A)	56	56
Indoor	Unit Width	In.	27.6	27.6
	Unit Height	In.	8.3	8.3
	Unit Depth	In.	23.6	23.6
	Net Weight	Lbs.	32.4	32.4
	Number of Fan Speeds		3	3
	Airflow (lowest to highest)	CFM	220/250/280	220/250/280
	Sound Pressure (lowest to highest)	dB(A)	37/38/41	34/41/45

*Condensing unit above or below indoor unit

DIMENSIONS - CASSETTE INDOOR

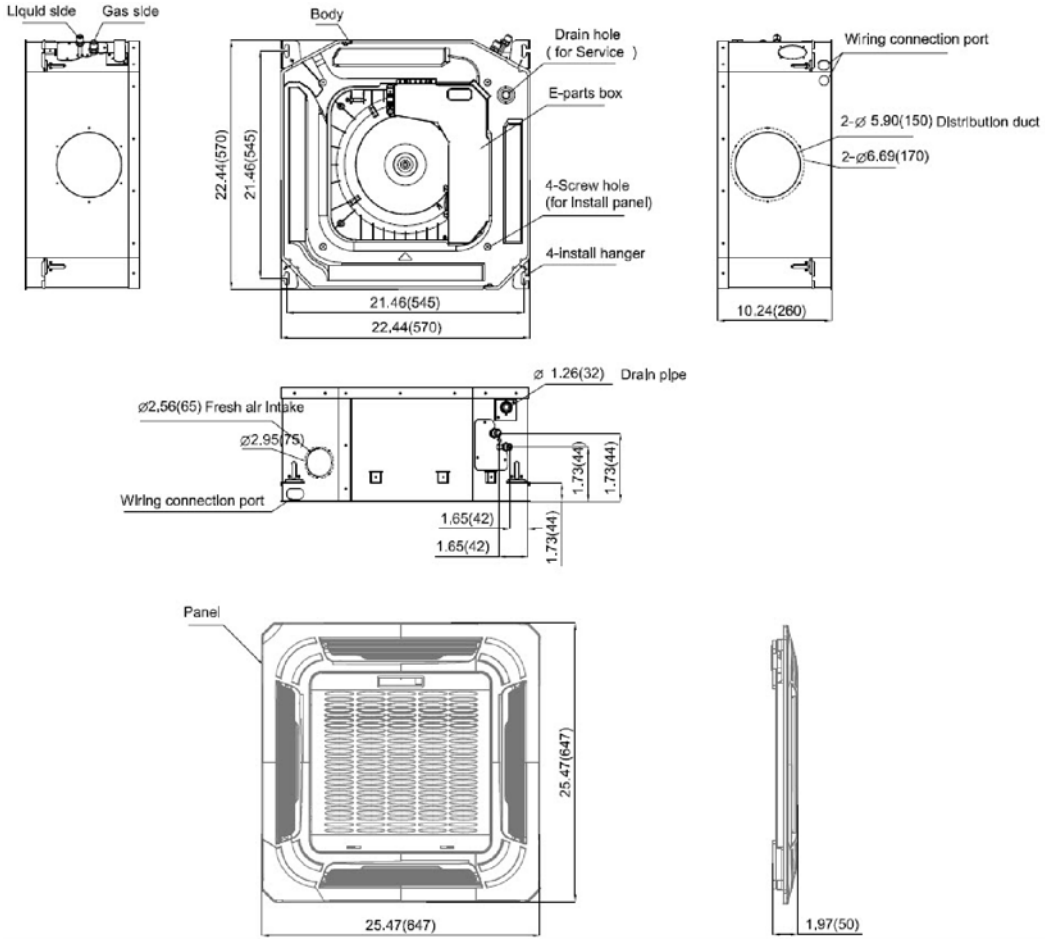


Fig. 1 – Indoor unit

Table 4—

Unit size		9K		12K		18K	
		body	panel	body	panel	body	panel
Dimensions							
Height	in(mm)	10.24 (260)	1.97 (50)	10.24 (260)	1.97 (50)	10.24 (260)	1.97 (50)
Width	in(mm)	22.44 (570)	25.47 (647)	22.44 (570)	25.47 (647)	22.44 (570)	25.47 (647)
Depth	in(mm)	22.44 (570)	25.47 (647)	22.44 (570)	25.47 (647)	22.44 (570)	25.47 (647)
Packing							
Height	in(mm)	11.42 (290)	4.84 (123)	11.42 (290)	4.84 (123)	11.42 (290)	4.84 (123)
Width	in(mm)	25.79 (655)	28.15 (715)	25.79 (655)	28.15 (715)	25.79 (655)	28.15 (715)
Depth	in(mm)	25.79 (655)	28.15 (715)	25.79 (655)	28.15 (715)	25.79 (655)	28.15 (715)
Weight-Gross	lbs(kg)	41.88 (19)	9.92 (4.5)	41.88 (19)	9.92 (4.5)	46.3 (21)	9.92 (4.5)
Weight-Net	lbs(kg)	35.27 (16)	5.51 (2.5)	35.27 (16)	5.51 (2.5)	39.68 (18)	5.51 (2.5)

DIMENSIONS - DUCTED INDOOR

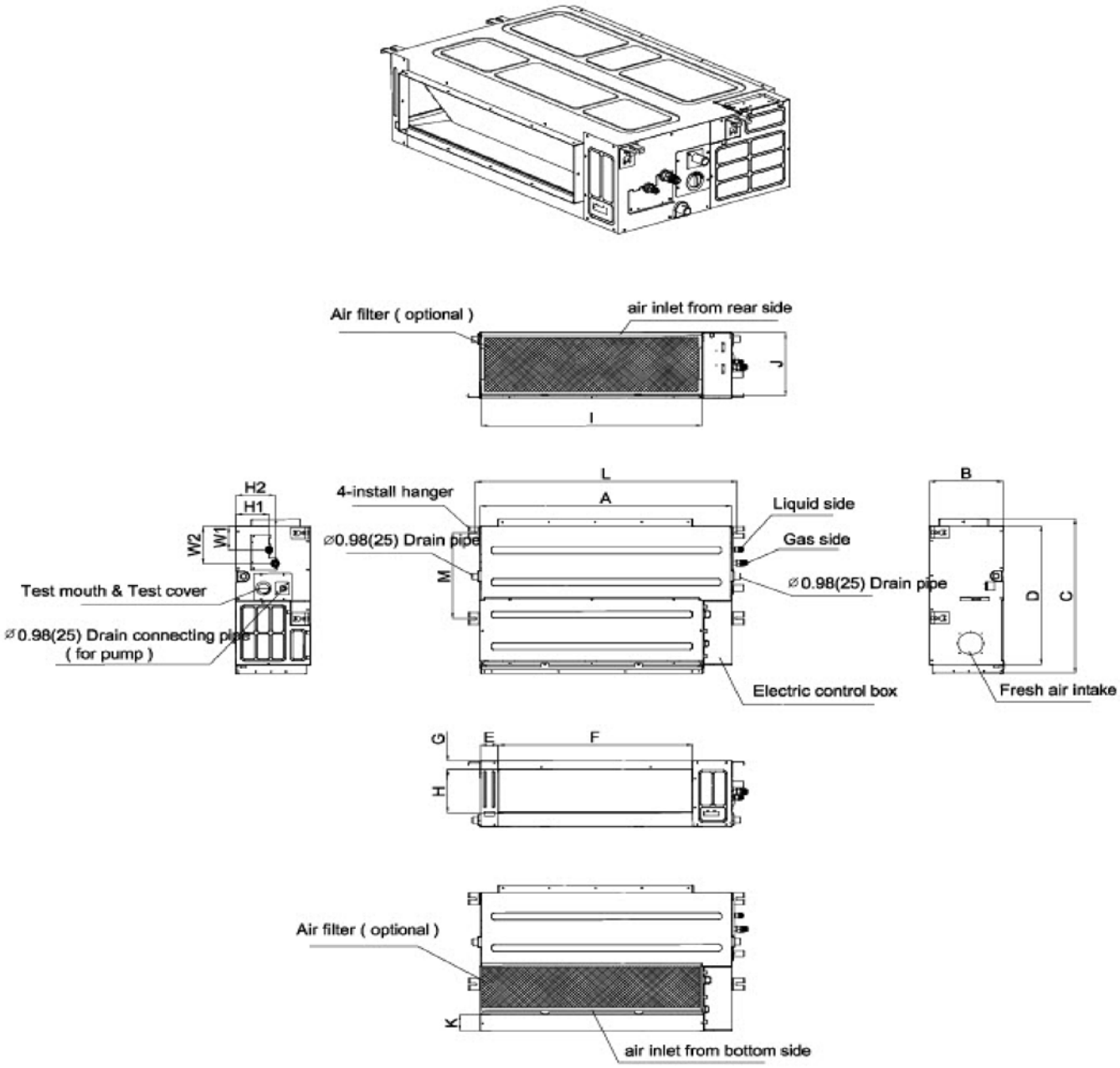


Fig. 2 – Indoor unit

Table 5—Ducted Dimensions and Weight

	Outline dimensions				Air outlet opening size				Air return opening size			Hanger Brackets		Refrigerant Pipe Locations			
Size	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**H1**	**H2**	**W1**	**W2**
9	27.6 (700)	8.2 (210)	25 (635)	22.4 (570)	2.5 (65)	19.4 (493)	1.3 (35)	4.6 (119)	23.4 (595)	7.8 (200)	3.1 (80)	29.1 (740)	13.8 (350)	4.7 (120)	5.6 (143)	3.7 (95)	5.9 (150)
12	27.6 (700)	8.2 (210)	25 (635)	22.4 (570)	2.5 (65)	19.4 (493)	1.3 (35)	4.6 (119)	23.4 (595)	7.8 (200)	3.1 (80)	29.1 (740)	13.8 (350)	4.7 (120)	5.6 (143)	3.7 (95)	5.9 (150)
18	36.2 (920)	8.2 (210)	25 (635)	22.4 (570)	2.5 (65)	19.4 (493)	1.3 (35)	4.6 (119)	32.0 (815)	7.8 (200)	3.1 (80)	37.8 (960)	13.8 (350)	4.7 (120)	5.6 (143)	3.7 (95)	5.9 (150)
24	36.2 (920)	10.6 (270)	25 (635)	22.4 (570)	2.5 (65)	19.4 (493)	1.3 (35)	7.0 (179)	32.0 (815)	10.2 (260)	0.7 (20)	37.8 (960)	13.8 (350)	4.7 (120)	5.6 (143)	3.7 (95)	5.9 (150)
36	44.8 (1140)	10.6 (270)	30.5 (775)	27.9 (710)	2.5 (65)	36.7 (933)	1.3 (35)	7.0 (179)	40.7 (1035)	10.2 (260)	1.7 (45)	48.8 (1240)	19.7 (500)	4.7 (120)	5.6 (143)	3.7 (95)	5.9 (150)
48	47.2 (1200)	11.8 (300)	34.1 (865)	31.4 (800)	3.1 (80)	38.1 (968)	1.5 (40)	8.0 (204)	43.0 (1094)	11.3 (288)	1.7 (45)	48.8 (1240)	19.7 (500)	6.9 (175)	7.8 (198)	6.1 (155)	8.3 (210)

DIMENSIONS - FLOOR CONSOLE INDOOR

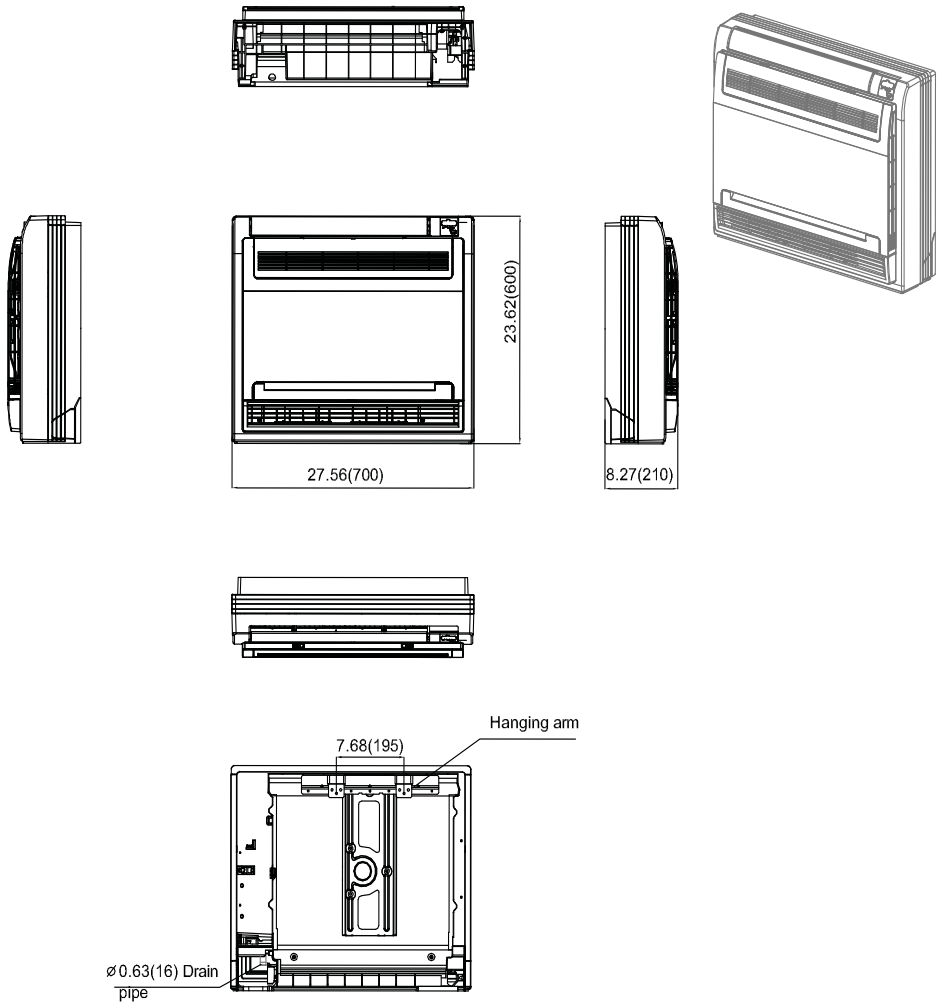


Fig. 3 – Indoor unit

Table 6—Floor Console Dimensions and Weight

Unit size		9	12
Height	in (mm)	8.27 (210)	8.27 (210)
Width	in (mm)	27.56 (700)	27.56 (700)
Depth	in (mm)	23.62 (600)	23.62 (600)
Weight-Net	Lb (kg.)	32.41 (14.7)	32.41 (14.7)

DIMENSIONS - OUTDOOR

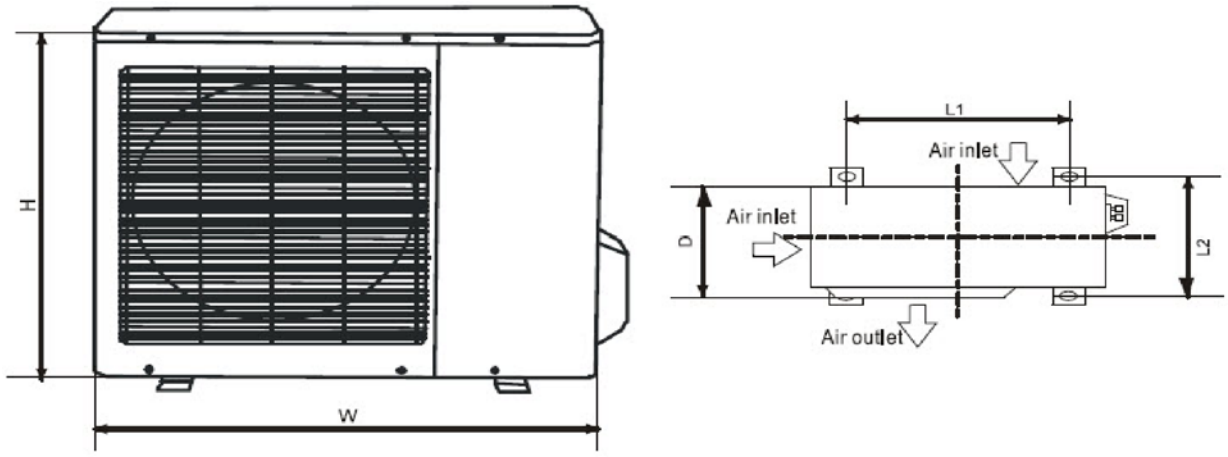
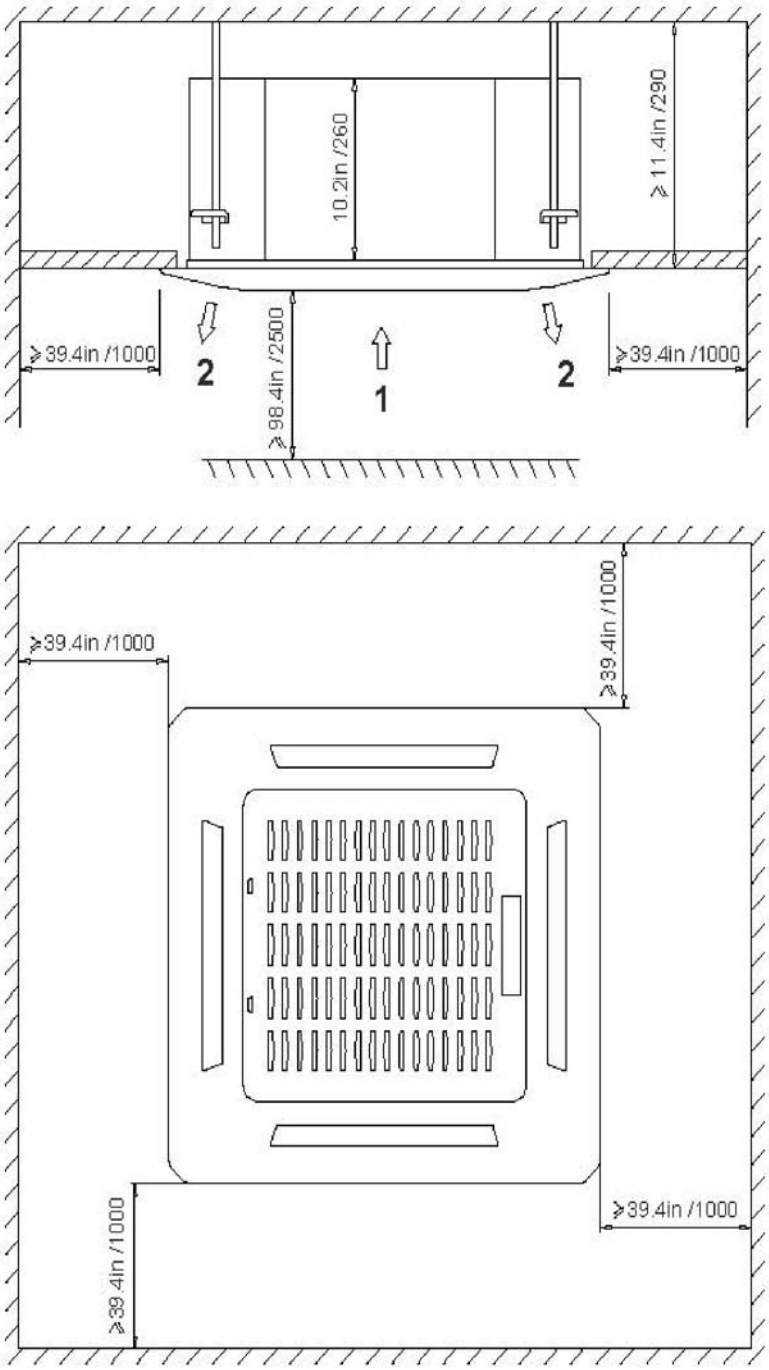


Fig. 4 – Outdoor unit

Table 7—Outdoor Dimensions and Weight

Unit Size	W in (mm)	D in (mm)	H in (mm)	L1 in (mm)	L2 in (mm)	Operating Weight lb (kg)
9K	31.8(810)	12.2(310)	21.9(558)	21.6(549)	12.8(325)	82.4(37.4)
12K	31.8(810)	12.2(310)	21.9(558)	21.6(549)	12.8(325)	82.4(37.4)
18K	33.2(845)	12.6(320)	27.5(700)	22.0(560)	13.1(405)	102.5(46.5)
24K	37.2(945)	15.5(395)	31.8(810)	25.2(640)	15.9(405)	137.5(62.4)
36K	37.2(945)	15.5(395)	31.8(810)	25.2(640)	15.9(405)	137.5(62.4)
48K	36.93(938)	15.4(392)	53.9(1369)	24.9(634)	15.9(404)	220(100)

CLEARANCES-INDOOR CASSETTE



Unit: in/mm

1 Air inlet

2 Air outlet

Fig. 5 – Indoor Unit Clearance

CLEARANCES - DUCTED INDOOR

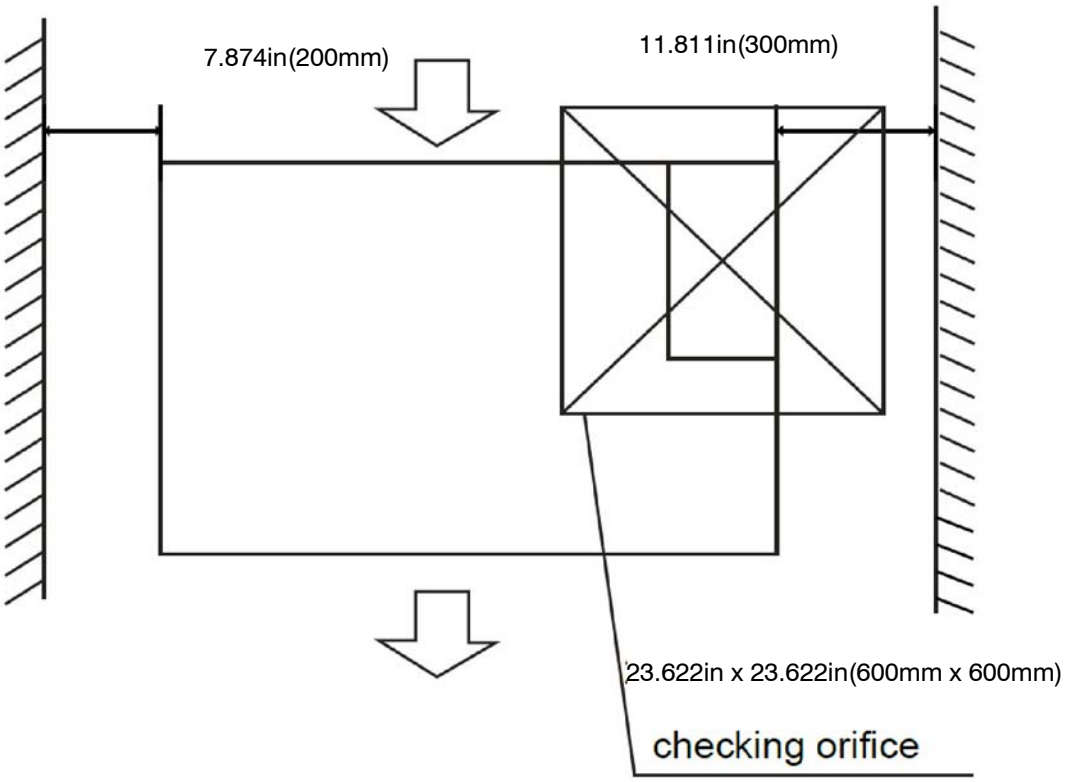


Fig. 6 – Indoor Unit Clearance

CLEARANCES - FLOOR CONSOLE INDOOR

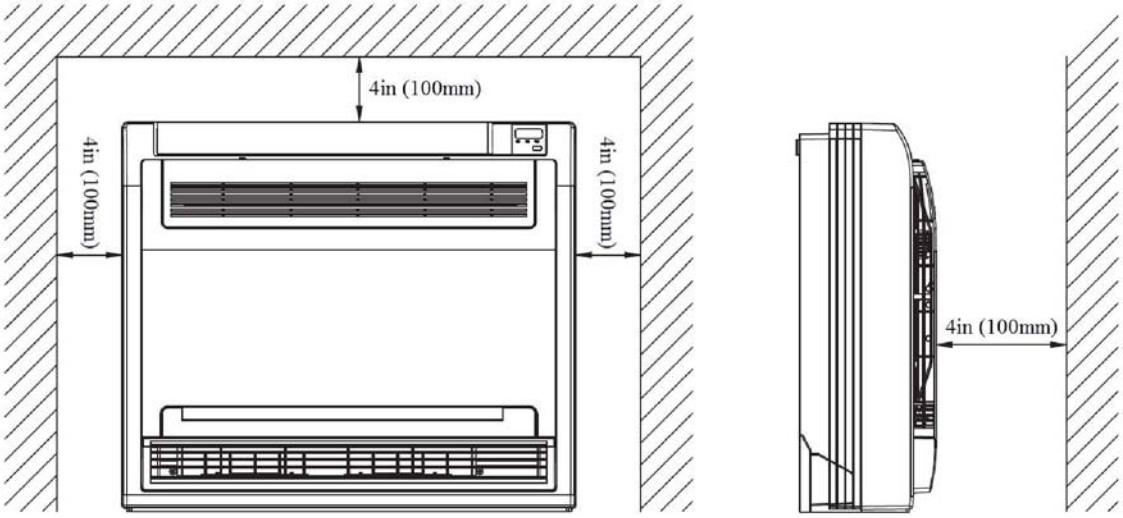


Fig. 7 – Indoor Unit Clearance

CLEARANCES - OUTDOOR

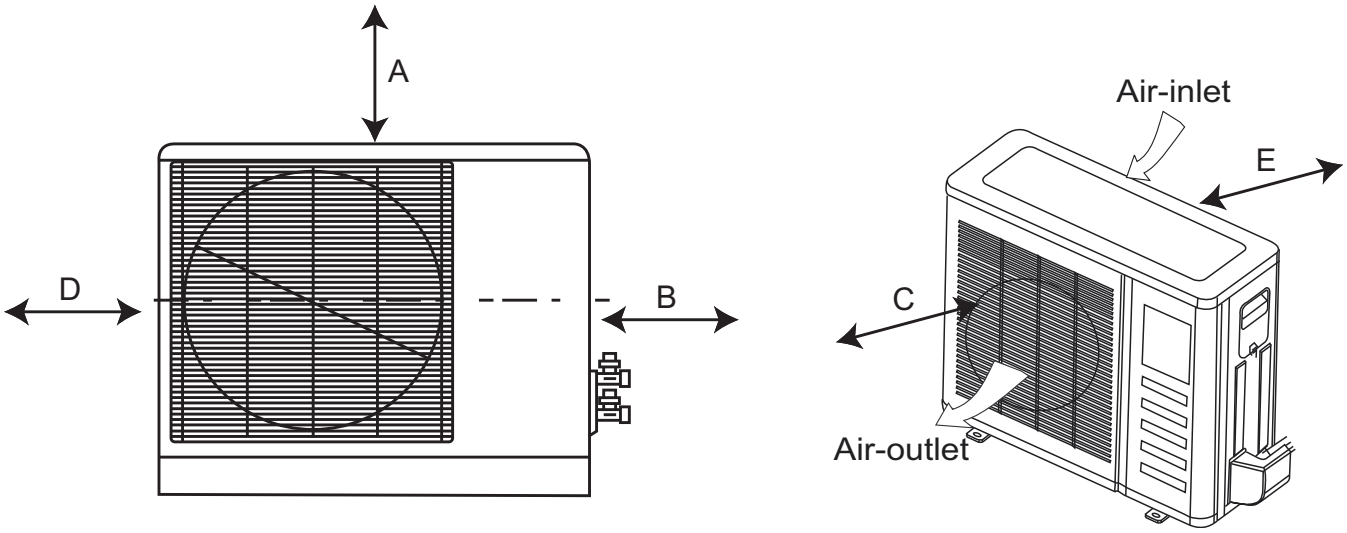


Fig. 8 – Clearances Outdoor

Table 8—MB*C Series

UNIT	Minimum Value in. (mm)
A	24 (609)
B	24 (609)
C	24 (609)
D	4 (101)
E	4 (101)

ELECTRICAL DATA

Table 9—Cassette

UNIT SIZE	OPER. VOLTAGE MAX / MIN*	COMPRESSOR		OUTDOOR FAN				INDOOR FAN				MCA	MAX FUSE CB AMP
		V-PH-HZ	RLA	V-PH-HZ	FLA	HP	W	V-PH-HZ	FLA	HP	W		
9	253 / 187	208-230/1/60	5.3	208-230/1/60	3.0	0.053	40	208-230/1/60	0.146	0.061	46	15	15
12			5.7		3.0	0.053	40		0.146	0.061	46	15	15
18			7.3		3.0	0.067	50		0.146	0.061	46	15	20

Table 10—Ducted

UNIT SIZE	OPER. VOLTAGE MAX / MIN*	COMPRESSOR		OUTDOOR FAN				INDOOR FAN				MCA	MAX FUSE CB AMP
		V-PH-HZ	RLA	V-PH-HZ	FLA	HP	W	V-PH-HZ	FLA	HP	W		
9	253 / 187	208-230/1/60	5.3	208-230/1/60	3	0.053	40	208-230/1/60	1.03	0.07	55	15	15
12			5.7		3	0.053	40		1.03	0.07	55	15	15
18			7.3		3	0.067	50		0.83	0.12	90	15	20
24			8.8		3	0.16	120		0.83	0.12	90	15	25
36			13.5		3	0.16	120		1.263	0.2	150	30	50
48			13.4		3	0.11	85		2.23	0.32	240	35	55

Table 11—Floor Console

UNIT SIZE	OPER. VOLTAGE MAX / MIN*	COMPRESSOR		OUTDOOR FAN				INDOOR FAN				MCA	MAX FUSE CB AMP
		V-PH-HZ	RLA	V-PH-HZ	FLA	HP	W	V-PH-HZ	FLA	HP	W		
9	253 / 187	208-230/1/60	5.3	208-230/1/60	3	0.053	40	208-230/1/60	0.21	0.027	20	15	15
12			5.7		3	0.053	40		0.21	0.027	20	15	15

*Permissible limits of the voltage range at which the unit will operate satisfactorily

LEGEND

FLA - Full Load Amps

MCA - Minimum Circuit Amps

RLA - Rated Load Amps

WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

Per caution note, only copper conductors with a minimum 300 volt rating and 2/64-inch thick insulation must be used.

The use of BX cable is not recommended.

Recommended Connection Method for Power and Communication Wiring - Power and Communication Wiring:

The main power is supplied to the outdoor unit. The field supplied 14/3 power/communication wiring from the outdoor unit to indoor unit consists of four (4) wires and provides the power for the indoor unit.

Two wires are high voltage AC power, one is communication wiring and the other is a ground wire.

Recommended Connection Method for Power and Communication Wiring (To minimize communication wiring interference)

Power Wiring:

The main power is supplied to the outdoor unit. The field supplied power wiring from the outdoor unit to indoor unit consists of three (3) wires and provides the power for the indoor unit. Two wires are high voltage AC power and one is a ground wire.

To minimize voltage drop, the factory recommended wire size is 14/2 stranded with a ground.

Communication Wiring:

A separate shielded copper conductor only, with a minimum 300 volt rating and 2/64-inch thick insulation, must be used as the communication wire from the outdoor unit to the indoor unit.

Please use a separate shielded 16GA stranded control wire.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

- Wires should be sized based on NEC and local codes.
- Use copper conductors only with a minimum 300 volt rating and 2/64 inch thick insulation.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

- Be sure to comply with local codes while running wire from indoor unit to outdoor unit.
- Every wire must be connected firmly. Loose wiring may cause terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.
- No wire should be allowed to touch refrigerant tubing compressor or any moving parts.
- Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner.
- Connecting cable with conduit shall be routed through hole in the conduit panel.

CONNECTION DIAGRAMS

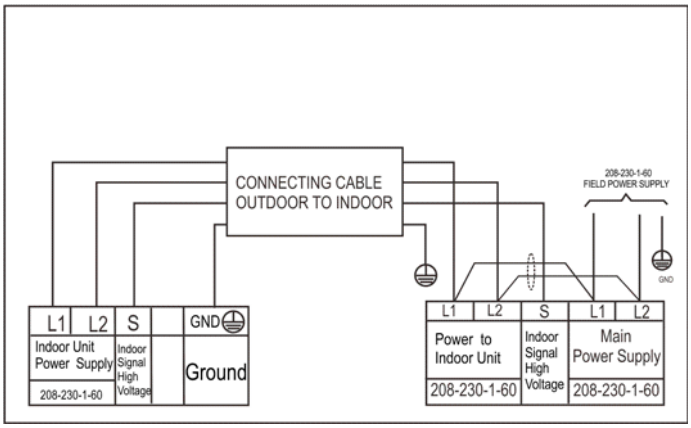


Fig. 9 – Connection Diagrams Sizes 9, 12, 18 & 24K

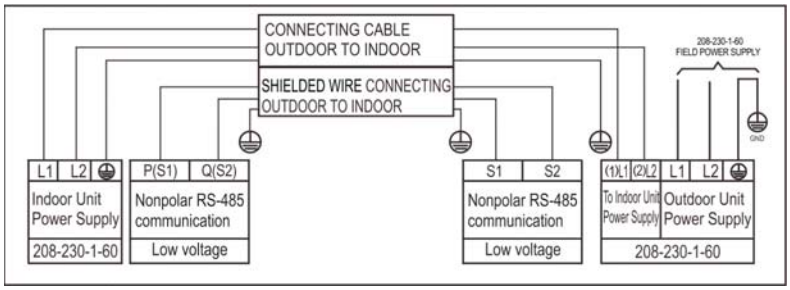


Fig. 10 – Connection Diagrams Sizes 36 & 48

Notes:

1. Do not use thermostat wire for any connection between indoor and outdoor units.
2. All connections between indoor and outdoor units must be as shown. **The connections are sensitive to polarity and will result in a fault code.**

WIRING DIAGRAMS CASSETTE

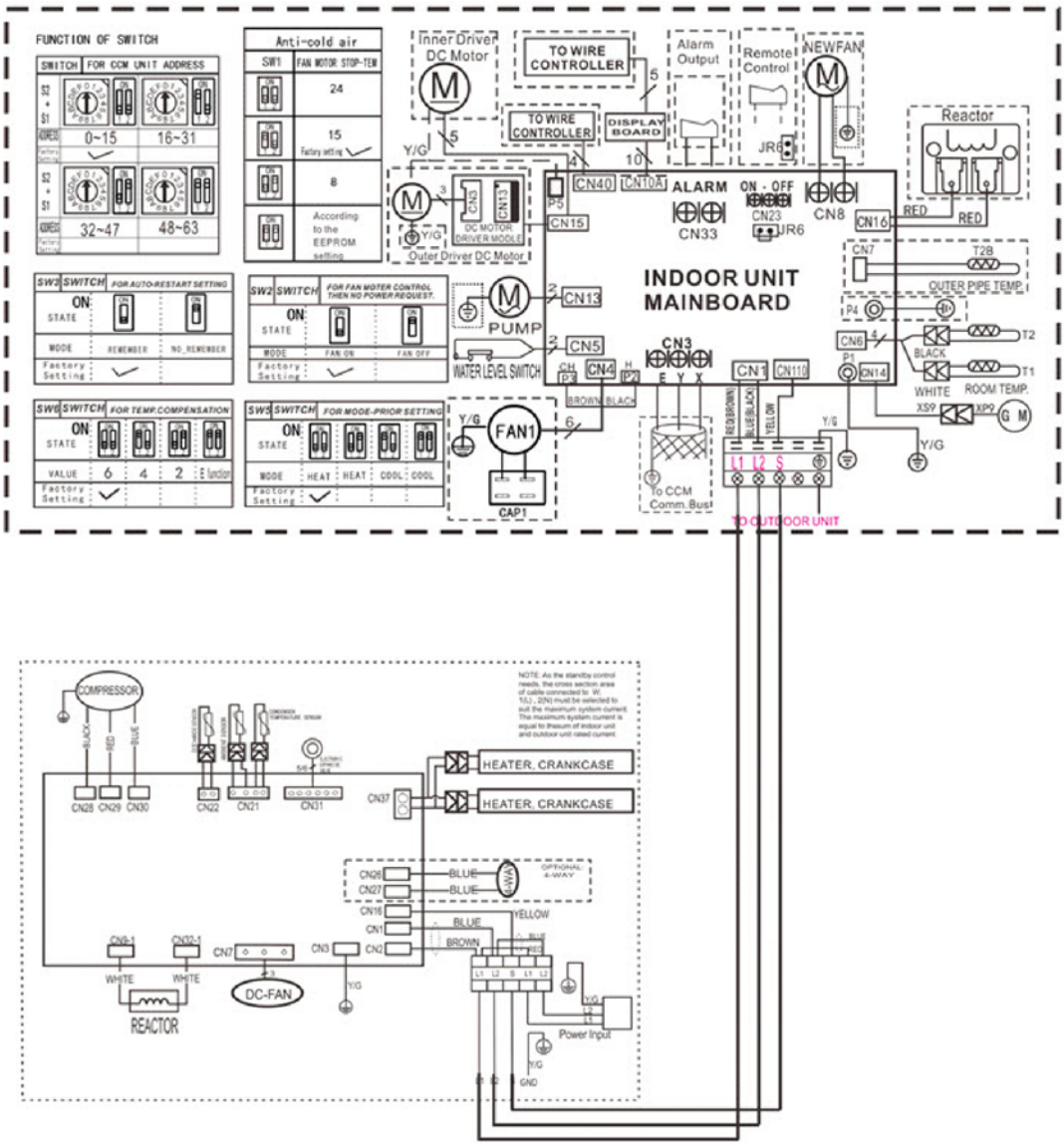


Fig. 11 – Cassette Sizes 9 & 12

Table 12—Input and Output Cassette Sizes 9 & 12

Indoor unit		Outdoor unit	
CODE	**PART NAME**	**CODE**	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal	CN31	Output:Pin5&6(12V) Pin1-Pin4:Pulse waveform,(0-12V)
CN3	Output: 0-5VDC Connection of the CCM	CN21	Input:Pin3-4 (3.3V) Pin2(0V),Pin1,Pin5(0-3.3V)
P1	Output: 0V Connection of the earth	CN22	Input:Pin1 (3.3V) Pin2(0-3.3V)
CN5	Output: 1-5VDC Connection of the Water level switch	CN37	Output: 230VAC High voltage
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN9-1,CN32-1	Output: Connection of the high voltage
CN10A	Output: 12VDC Connection of the Display board	CN1	Input:230VAC High voltage
CN13	Output: 220VAC High voltage Connection of the Pump	CN2	Input:230 VAC High voltage
CN14	Output: 12VDC Connection of the Swing motor	CN3	Connection to the earth
CN15	Output: 320VDC High voltage Connection of the DC Fan	CN16	Output: Connection of the high voltage
CN16	Output: 320VDC High voltage Connection of the Reactor	CN26,CN27	Output: High voltage for 4-way control
CN23	Output: 1-12VDC Connection of the Remote switch	CN7	Output: Pulse(0-320VDC) for DC FAN
CN33	Output: 0V Connection of the Alarm	U V W	Output: Pulse(0-320VDC) for COMPRESSOR
CN40	Output: 12VDC Connection of the Wire controller		
CN110	Output: 24VDC between Pin2 of CN1 connection of the S signal		

WIRING DIAGRAMS CASSETTE (CONTINUED)

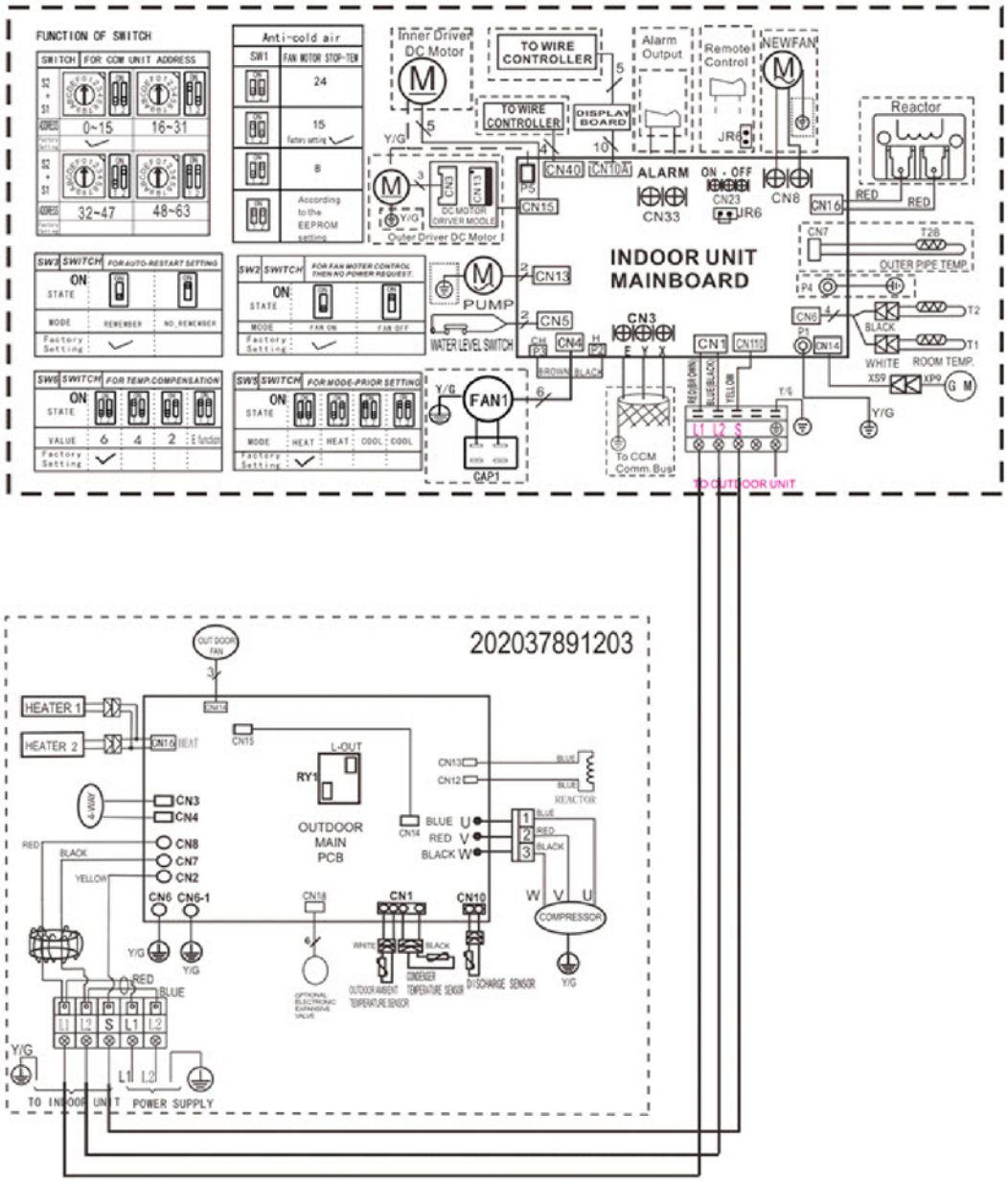


Fig. 12 – Cassette Size 18

Table 13—Input and Output Cassette Size 18

Indoor unit		Outdoor unit	
CODE	**PART NAME**	**CODE**	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal	CN7、CN8	Input: 230V High voltage
CN3	Output: 0-5VDC Connection of the CCM	CN2	Output: Connection of the high voltage
P1	Output: 0V Connection of the earth	CN3、CN4	Output: High voltage for 4-way control
CN5	Output: 1-5VDC Connection of the Water level switch	CN11、CN16	Output: 230V High voltage for HEATER
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN5	Output: Pulse(0-320V) for DC FAN
CN10A	Output: 12VDC Connection of the Display board	CN12、CN13	Output: Connection of the high voltage
CN13	Output: 220VAC High voltage Connection of the Pump	U V W	Output: Pulse(0-320V) for compressor
CN14	Output: 12VDC Connection of the Swing motor	CN10	Input:Pin1 (5V) Pin2(0-5V)
CN15	Output: 320VDC High voltage Connection of the DC Fan	CN1	Input:Pin3-4 (5V) Pin2(0V),Pin1,Pin5(0-5V)
CN16	Output: 320VDC High voltage Connection of the Reactor	CN18	Output:Pin5&6(12V) Pin1-Pin4:Pulse waveform,(0-12V)
CN23	Output: 1-12VDC Connection of the Remote switch		
CN33	Output: 0V Connection of the Alarm		
CN40	Output: 12VDC Connection of the Wire controller		
CN110	Output: 24VDC Between Pin2 of CN1 Connection of the S signal		

WIRING DIAGRAMS DUCTED

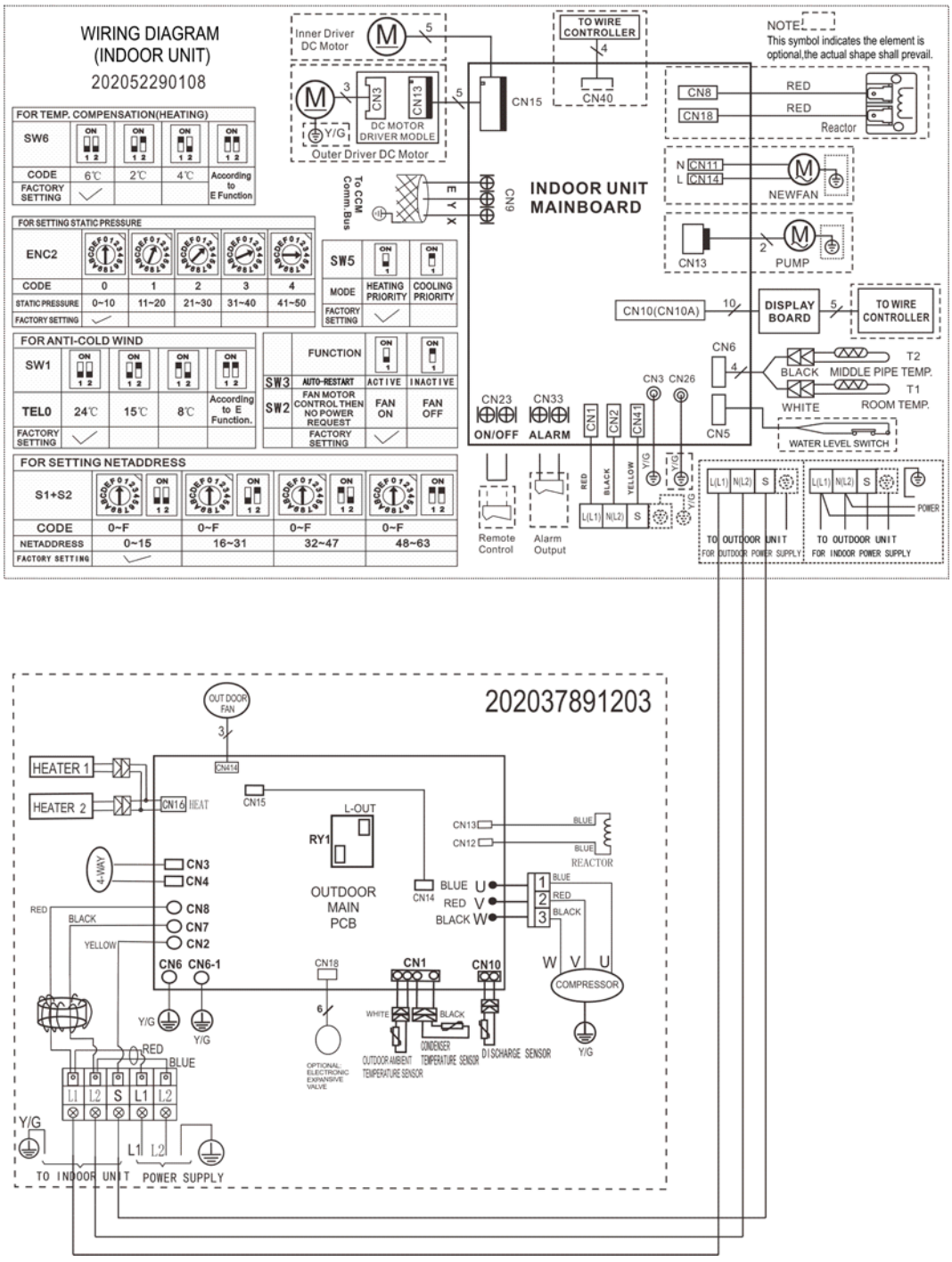


Fig. 13 – Wiring Diagram Ducted Sizes 09 & 12

Table 14—Input and Output Ducted Sizes 9 & 12

Indoor unit		Outdoor unit	
CODE	**PART NAME**	**CODE**	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal	CN7、CN8	Input: 230V High voltage
CN2	Input: 230VAC High voltage Connection of the terminal	CN2	Output: Connection of the high voltage
CN3/CN26	Output: 0V Connection of the earth	CN3、CN4	Output: High voltage for 4-way control
CN5	Output: 0-5VDC Connection of the Water level switch	CN11、CN16	Output: 230V High voltage for HEATER
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN5	Output: Pulse(0-320V) for DC FAN
CN8/CN18	Output: 320VDC High voltage Connection of the Reactor	CN12、CN13	Output: Connection of the high voltage
CN9	Output: 5VDC Connection of the CCM	U V W	Output: Pulse(0-320V) for compressor
CN10(CN10A)	Output: 12VDC Connection of the Display board	CN10	Input:Pin1 (5V) Pin2(0-5V)
CN11/CN14	Output: 220VAC High voltage Connection of the New Fan	CN1	Input:Pin3-4 (5V) Pin2(0V),Pin1,Pin5(0-5V)
CN13	Output: 220VAC High voltage Connection of the Pump	CN18	Output:Pin 5&6 (12V) Pin1-Pin4:Pulse waveform,(0-12V)
CN15	Output: 320VDC High voltage Connection of the Fan board		
CN23	Output: 1-12VDC Connection of the Remote switch		
CN33	Output: 0V Connection of the Alarm		
CN40	Output: 12VDC Connection of the Wire controller		
CN41	Output: 24VDC Between CN2 Connection of the S signal		

WIRING DIAGRAMS DUCTED (CONTINUED)

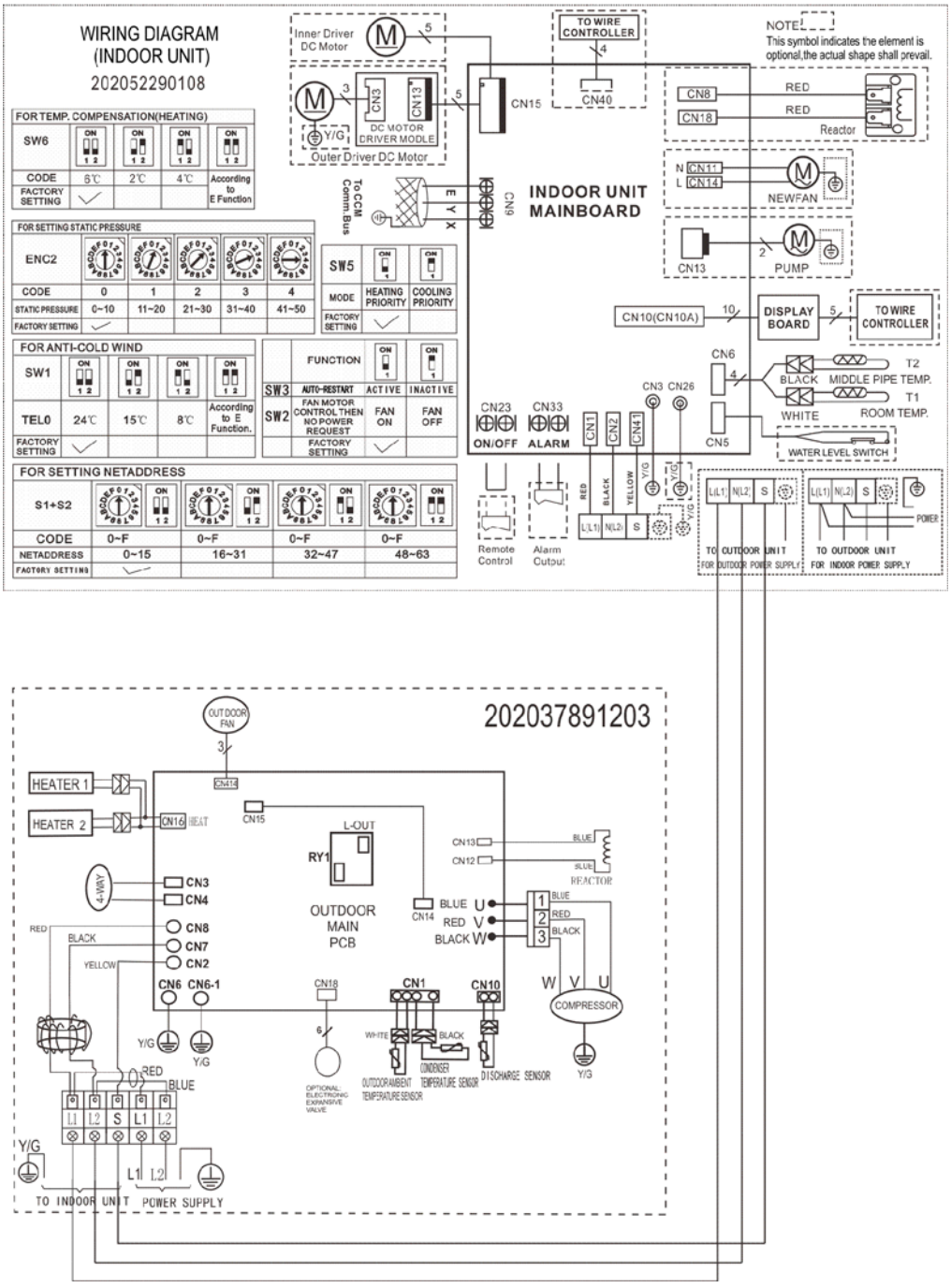


Fig. 14 – Wiring Diagram Ducted Size 18

Table 15—Input and Output Size 18

Indoor unit		Outdoor unit	
CODE	**PART NAME**	**CODE**	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal	CN7、CN8	Input: 230V High voltage
CN2	Input: 230VAC High voltage Connection of the terminal	CN2	Output: Connection of the high voltage
CN3/CN26	Output: 0V Connection of the earth	CN3、CN4	Output: High voltage for 4-way control
CN5	Output: 0-5VDC Connection of the Water level switch	CN11、CN16	Output: 230V High voltage for HEATER
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN5	Output: Pulse(0-320V) for DC FAN
CN8/CN18	Output: 320VDC High voltage Connection of the Reactor	CN12、CN13	Output: Connection of the high voltage
CN9	Output: 5VDC Connection of the CCM	U V W	Output: Pulse(0-320V) for compressor
CN10(CN10A)	Output: 12VDC Connection of the Display board	CN10	Input:Pin1 (5V) Pin2(0-5V)
CN11/CN14	Output: 220VAC High voltage Connection of the New Fan	CN1	Input:Pin3-4 (5V) Pin2(0V),Pin1,Pin5(0-5V)
CN13	Output: 220VAC High voltage Connection of the Pump	CN18	Output:Pin5&6(12V) Pin1-Pin4:Pulse waveform,(0-12V)
CN15	Output: 320VDC High voltage Connection of the Fan board		
CN23	Output: 1-12VDC Connection of the Remote switch		
CN33	Output: 0V Connection of the Alarm		
CN40	Output: 12VDC Connection of the Wire controller		
CN41	Output: 24VDC Between CN2 Connection of the S signal		

WIRING DIAGRAMS DUCTED (CONTINUED)

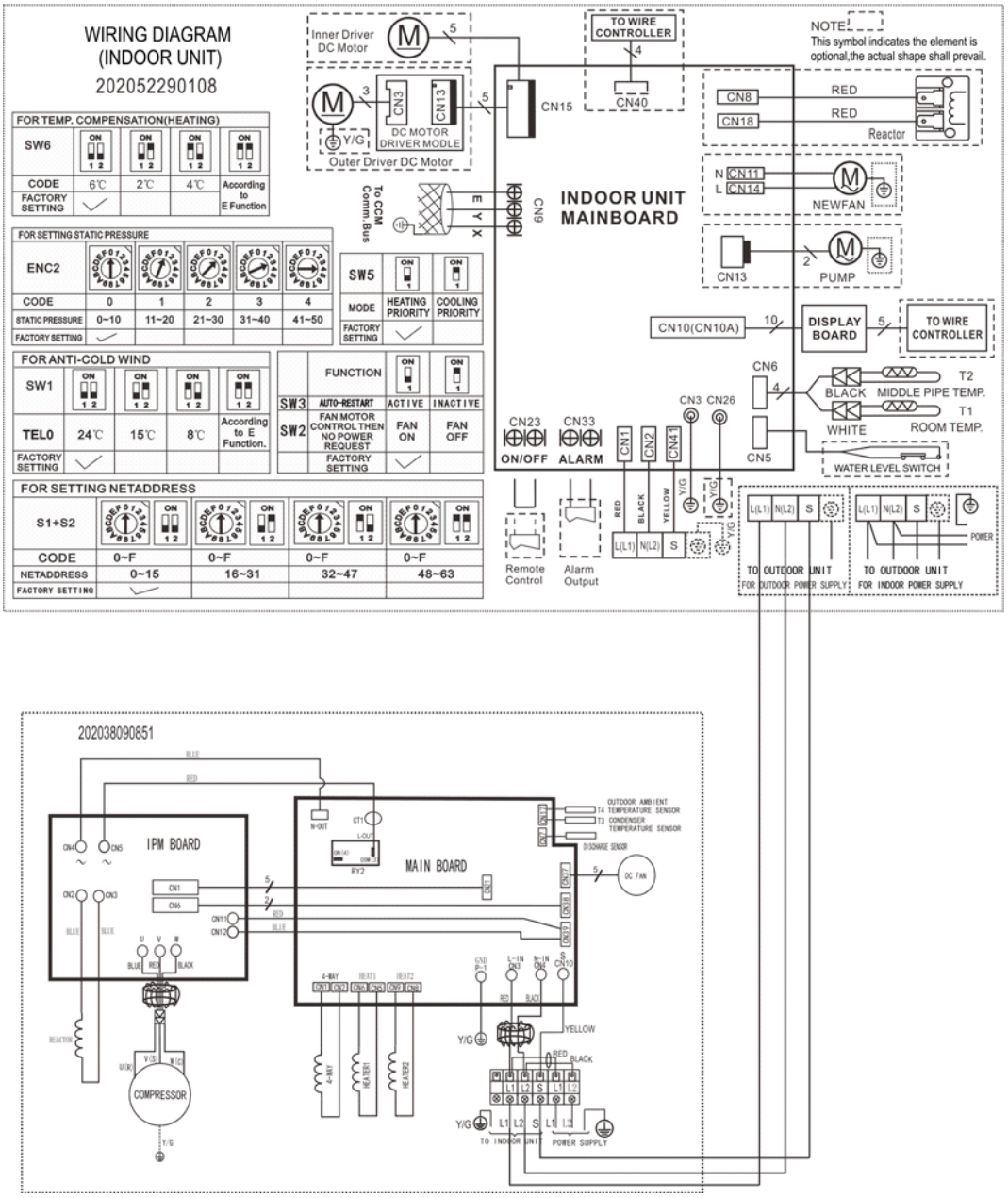
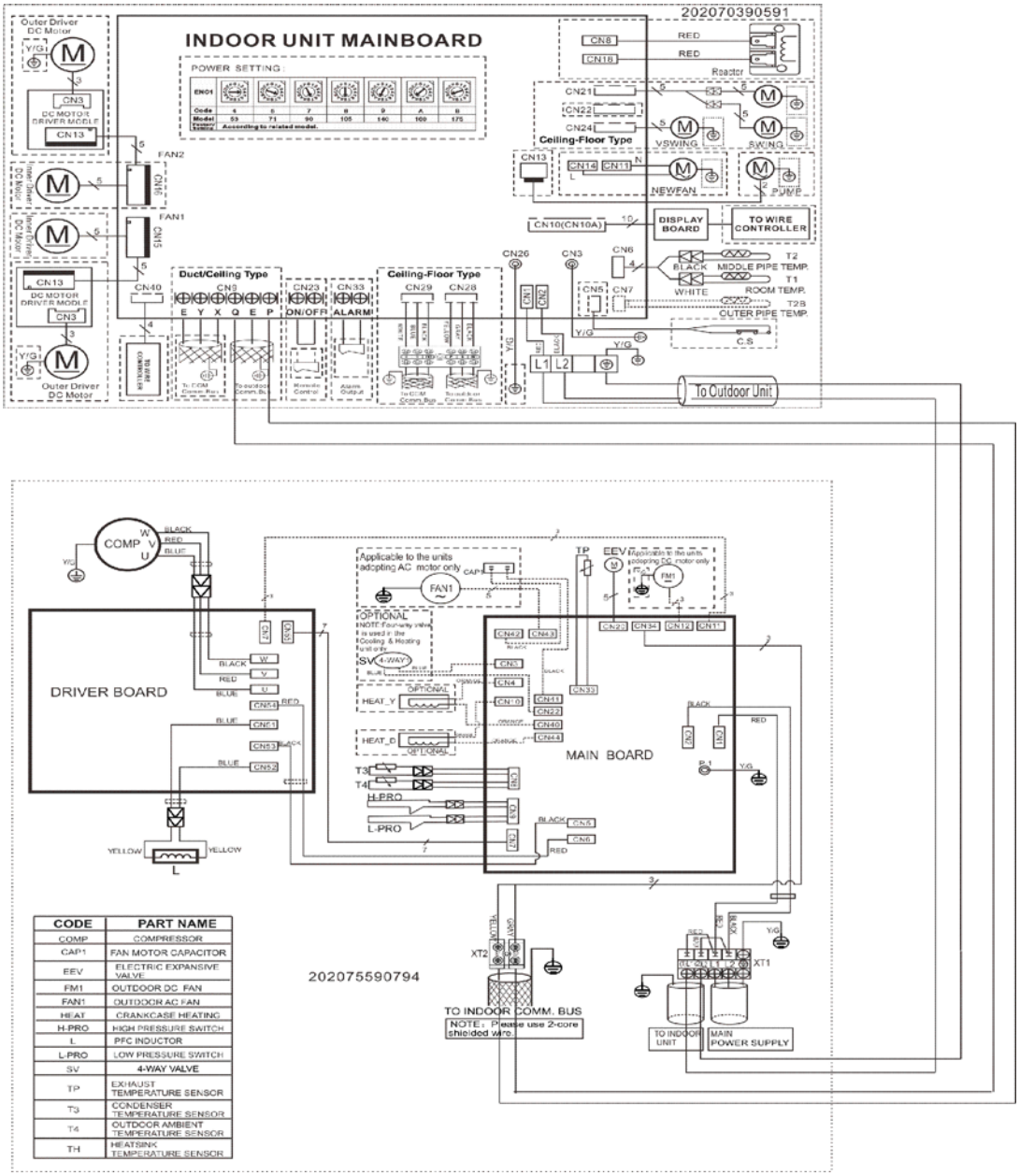


Fig. 15 – Wiring Diagram Ducted Size 24

Table 16—Input and Output Ducted Size 24

Indoor unit		Outdoor unit	
CODE	**PART NAME**	**CODE**	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal	CN17	Input:Pin4-5 (3.3V) (T4) Pin2(0V),Pin1,Pin3(0-3.3V) (T3)
CN2	Input: 230VAC High voltage Connection of the terminal	CN7	Input:Pin1 (3.3V) Pin2(0-3.3V) (TP)
CN3/CN26	Output: 0V Connection of the earth	CN5,CN6	Output:230V High voltage for heater1 control
CN5	Output: 0-5VDC Connection of the Water level switch	CN8,CN9	Output:230V High voltage for heater2 control
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN2,CN3 (IPM BOARD)	Output: Connection of the high voltage (REACTOR)
CN8/CN18	Output: 320VDC High voltage Connection of the Reactor	CN3 (MAIN BOARD)	Input:230V High voltage (L)
CN9	Output: 5VDC Connection of the CCM	CN4	Input:230V High voltage (N)
CN10(CN10A)	Output: 12VDC Connection of the Display board	P-1	Connection to the earth (GND)
CN11/CN14	Output: 220VAC High voltage Connection of the New Fan	CN10	Output: Connection of the high voltage (S)
CN13	Output: 220VAC High voltage Connection of the Pump	CN1,CN2 (MAIN BOARD)	Output: High voltage for 4-way control
CN15	Output: 320VDC High voltage Connection of the Fan board	CN37	Output: Pulse(0-320V) for DC FAN
CN23	Output: 1-12VDC Connection of the Remote switch	U V W	Output: Pulse(0-320V) for COMPRESSORS
CN33	Output: 0V Connection of the Alarm		
CN40	Output: 12VDC Connection of the Wire controller		
CN41	Output: 24VDC Between CN2 Connection of the S signal		

WIRING DIAGRAMS DUCTED (CONTINUED)



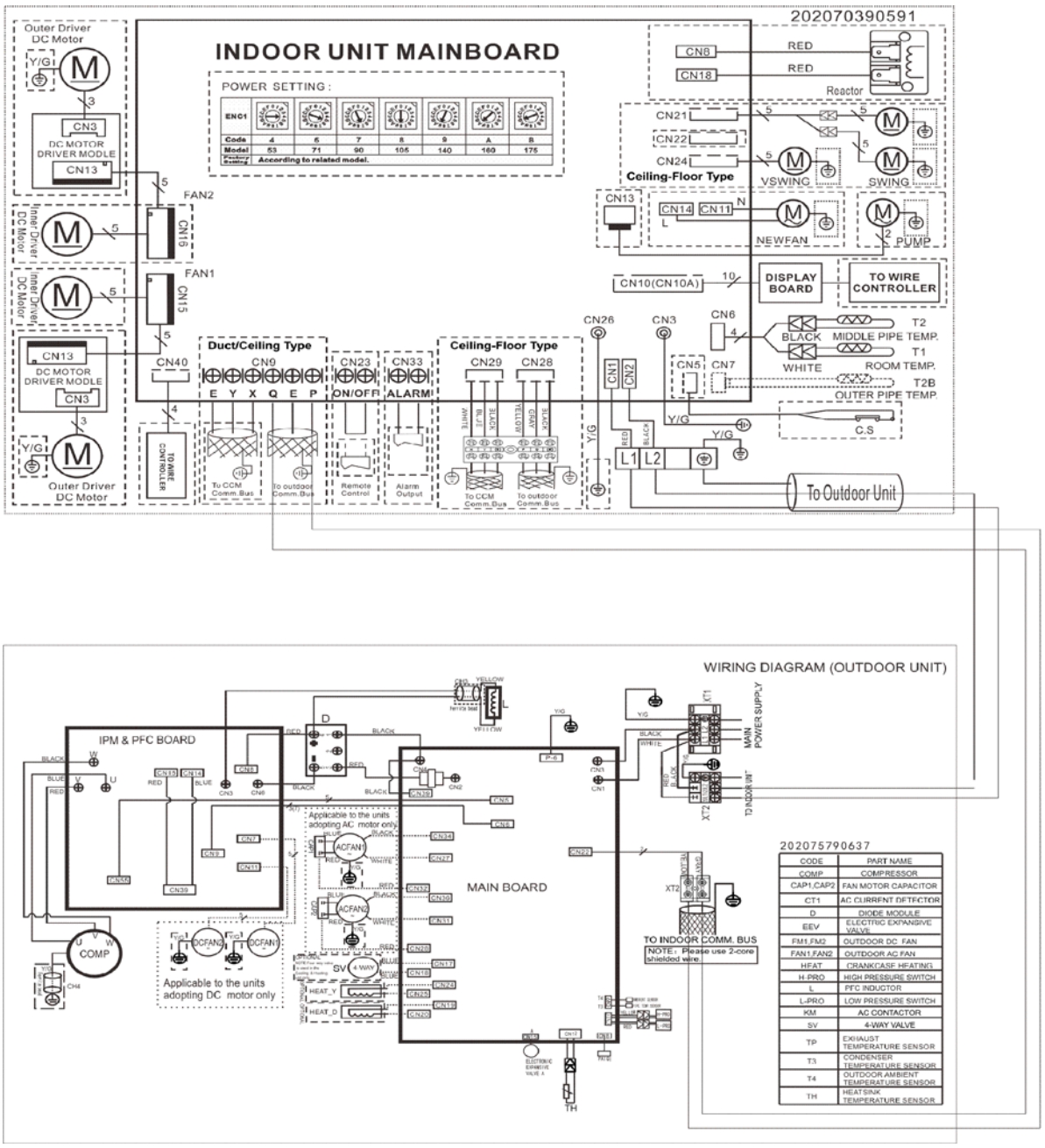
CODE	PART NAME
COMP	COMPRESSOR
CAP1	FAN MOTOR CAPACITOR
EEV	ELECTRIC EXPANSIVE VALVE
FM1	OUTDOOR DC FAN
FAN1	OUTDOOR AC FAN
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	HEATSINK TEMPERATURE SENSOR

Fig. 16 – Wiring Diagram Ducted Size 36

Table 17—Input and Output Ducted Size 36

Indoor unit		Outdoor unit (main board)	
CODE	**PART NAME**	**PART NAME**	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal	CN1,CN2	Power input: 230V AC
CN2	Input: 230VAC High voltage Connection of the terminal	CN3,CN22	Output: High voltage for 4-way control (230V AC)
CN3	Output: 0V Connection of the earth	CN4,CN40	Output: High voltage for HEAT_Y control(230V AC)
CN5	Output: 0-5VDC Connection of the Water level switch	CN5,CN6	Output: Power output to DRIVER BOARD (230V AC)
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN7	Input: Communication Main board and IPM Board,Pin1(12V DC),Pin2(5V DC)
CN7	Output: 5VDC Connection of the Outer Pipe temperature	CN8,CN33	Input: Temperature sensor (5V DC)
CN9	Output: 5VDC Connection of the CCM and RS-485	CN9	Input: Pressure test (5V DC)
CN10(CN10A)	Output: 12VDC Connection of the Display board	CN10,CN44	Output: High voltage for HEAT_D control (230V AC)
CN13	Output: 220VAC High voltage Connection of the Pump	CN11,CN12	Output: Pulse(0-380VDC) for DC FAN
CN15	Output: 320VDC High voltage Connection of the Fan board	CN20	Output: PMV control，Pin5(12V DC),Pin6(12V DC)
CN23	Output: 1-12VDC Connection of the Remote switch	CN34	Communication to indoor unit,Pin1(5V DC),Pin3(5V DC)
CN33	Output: 0V Connection of the Alarm	CN41,CN42,CN43	Output: Power output for AC fan motor (230V AC)
CN40	Output: 12VDC Connection of the Wire controller	P-1	Connection to the earth
		Outdoor unit(Driver board)	
		PART NAME	**PART NAME**
		U V W	Output: Pulse(0-380VDC) for COMPRESSOR
		CN7	Output: Pulse(0-380VDC) for DC FAN
		CN51,CN52	Output: Connect PFC Inductance, high DC Voltage
		CN53,CN54	Input: Power input for DRIVER BOARD (230V AC)
		CN55	Output: Communication IPM Board and Main board,Pin1(12V DC),Pin2(5V DC)

WIRING DIAGRAMS DUCTED (CONTINUED)



CODE	PART NAME
COMP	COMPRESSOR
CAP1,CAP2	FAN MOTOR CAPACITOR
CT1	AC CURRENT DETECTOR
D	DIODE MODULE
EEV	ELECTRIC EXPANSIVE VALVE
FM1,FM2	OUTDOOR DC FAN
FAN1,FAN2	OUTDOOR AC FAN
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
KM	AC CONTACTOR
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	HEAT SINK TEMPERATURE SENSOR

Fig. 17 – Wiring Diagram Ducted Size 48

Table 18—Input and Output Ducted Size 48

CODE	PART NAME	Outdoor unit (main board)	
Indoor unit		CN1,CN3	Power input: 230V AC
CN1	Input: 230VAC High voltage Connection of the terminal	CN2,CN4	Output: Power output for DRIVER BOARD (230V AC)
CN2	Input: 230VAC High voltage Connection of the terminal	CN5	Input: Communication Main board and IPM Board, Pin1(5V DC)
CN3	Output: 0V Connection of the earth	CN6	Input: DC FAN motor1 and DC FAN motor2 control, (Pin7 5V DC)
CN5	Output: 0-5VDC Connection of the Water level switch	CN8,CN9,CN12	Input: Temperature sensor (5V DC)
CN6	Output: 5VDC Connection of the Room and Pipe temperature	CN10	Input: Pressure test (5V DC)
CN7	Output: 5VDC Connection of the Outer Pipe temperature	CN15	Output: PMV control，Pin5(12V DC),Pin6(12V DC)
CN9	Output: 5VDC Connection of the CCM and RS-485	CN17,CN18	Output: High voltage for 4-way(SV) control (230V AC)
CN10(CN10A)	Output: 12VDC Connection of the Display board	CN19,CN20	Output: High voltage for HEAT_D control (230V AC)
CN13	Output: 220VAC High voltage Connection of the Pump	CN22	Communication to indoor unit,Pin1(5V DC),Pin3(5V DC)
CN15	Output: 320VDC High voltage Connection of the Fan board	CN24,CN25	Output: High voltage for HEAT_Y control(230V AC)
CN23	Output: 1-12VDC Connection of the Remote switch	CN27、CN32、CN34C N28、CN31、CN36	Output: Power output for AC FAN motor1 and AC FAN motor2 (230V AC)
CN33	Output: 0V Connection of the Alarm	CN39	Output: L2 for AC FAN、SV and HEAT ,High voltage (AC)
CN40	Output: 12VDC Connection of the Wire controller	P-6	Connection to the earth
		Outdoor unit (Driver board)	
		U V W	Output: Pulse(0-380VDC) for COMPRESSOR
		CN6 ,CN8	Input: Power input for DRIVER BOARD (200-320V DC)
		CN3	Output: Connect PFC Inductance, high DC voltage
		CN7,CN11	Output: DC FAN motor1 and DC FAN motor2 control (Pin1 310V or 380V DC)
		CN9	Output: Communication Main board and IPM Board Pin7(5V DC)
		CN55	Output: Communication IPM Board and Main board Pin1(12V DC)
		CN14、CN15-- CN39,	Output: High DC voltage (310V or 380V DC)

WIRING DIAGRAMS FLOOR CONSOLE

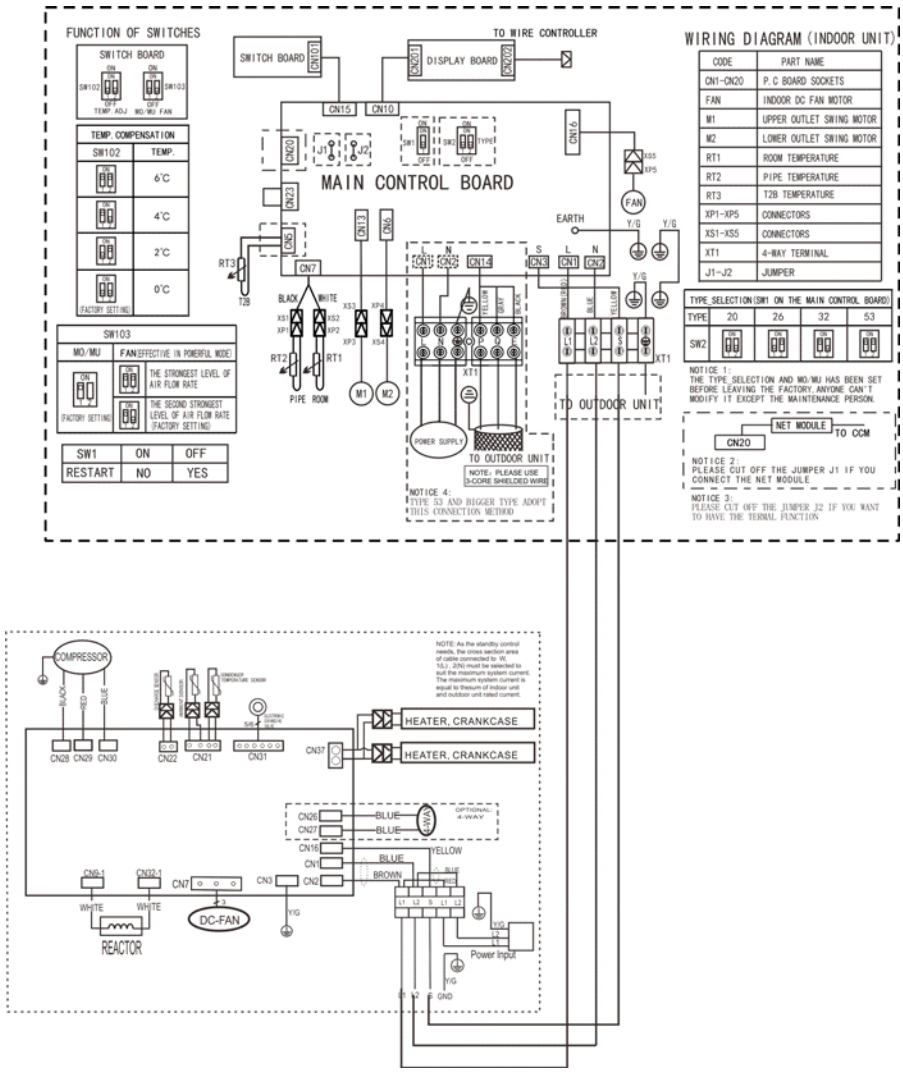


Fig. 18 – Wiring Diagram Floor Console Sizes 9 and 12

Table 19—Input and Output Floor Console Sizes 9 &12

Indoor Unit Control Board	
CODE	**PART NAME**
CN1	Input: 230VAC High voltage Connection of the terminal
CN2	'Input: 230VAC High voltage Connection of the terminal
CN3	Output: 24VDC Between CN2 Connection of the S signal
CN6	Output: 12VDC Connection of the Lower outlet swing motor
CN7	Output: 5VDC Connection of the Room and Pipe temperature
CN10	Output: 12VDC Connection of the Display board
CN13	Output: 12VDC Connection of the Upper outlet swing motor
CN15	Output: 1-5VDC Connection of the Switch board
CN16	Output: 320VDC Connection of the Fan high voltage
CN20	Output: 5VDC Connection of the Net module
CN23	Output: 1-12VDC Connection of the Remote switch

Outdoor Unit Control Board	
CODE	**PART NAME**
CN31	Output:Pin5&6(12V) Pin1-Pin4:Pulse waveform,(0-12V)
CN21	Input:Pin3-4 (3.3V) Pin2(0V),Pin1,Pin5(0-3.3V)
CN22	Input:Pin1 (3.3V) Pin2(0-3.3V)
CN37	Output: 230VAC High voltage
CN9-1,CN32-1	Output: Connection of the high voltage
CN1	Input:230VAC High voltage
CN2	Input:230 VAC High voltage
CN3	Connection to the earth
CN16	Output: Connection of the high voltage
CN26,CN27	Output: High voltage for 4-way control
CN7	Output: Pulse(0-320VDC) for DC FAN
U V W	Output: Pulse(0-320VDC) for COMPRESSOR

REFRIGERATION CYCLE DIAGRAMS

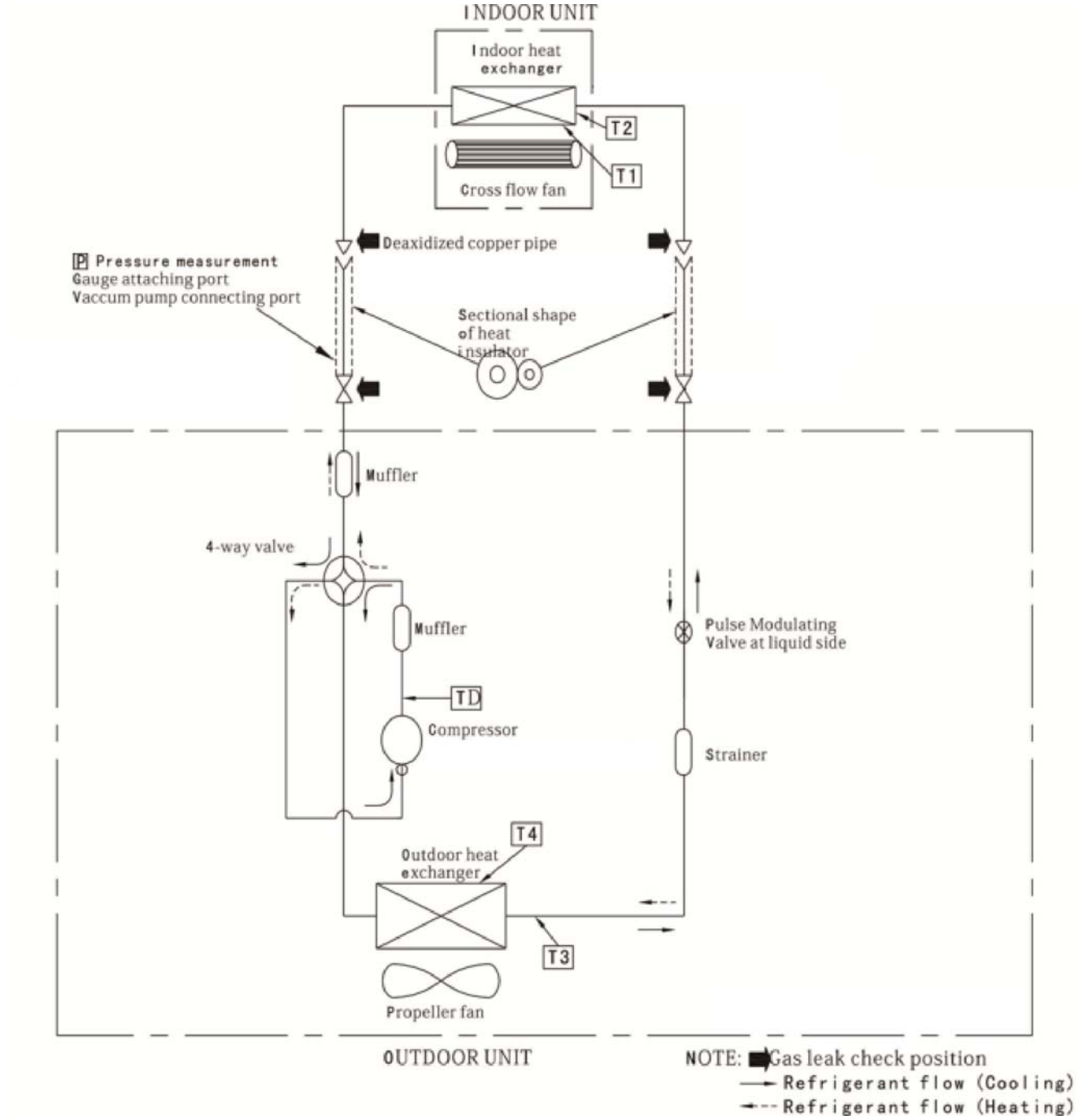


Fig. 19 – Refrigerant Cycle Diagrams

REFRIGERANT LINES

General refrigerant line sizing:

1 The outdoor units are shipped with a full charge of R410A refrigerant. All charges, line sizing, and capacities are based on runs of 25 ft (7.6 m). For runs over 25 ft (7.6 m), consult long-line section on this page for proper charge adjustments.

2 Minimum refrigerant line length between the indoor and outdoor units is 10 ft. (3 m).

3 Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, not more than 36-in (914 mm) should be buried. Provide a minimum 6-in (152 mm) vertical rise to the service valves to prevent refrigerant migration.

4 Both lines must be insulated. Use a minimum of 1/2-in. (12.7 mm) thick insulation. Closed-cell insulation is recommended in all long-line applications.

5 Special consideration should be given to isolating interconnecting tubing from the building structure. Isolate the tubing so that vibration or noise is not transmitted into the structure.

- For piping runs greater than 25 ft. (7.6 m), add refrigerant up to the allowable length as specified below.

Long Line Applications,:

1 No change in line sizing is required.

2 Add refrigerant per table below.

Table 20—Additional Charge Table - Cassette

Unit Size	Total Line Length ft		Additional Charge, oz/ft. ft (m)		
	Min	Max	10 - 25 (3 - 8)	>25 - 82 (8 - 25)	>82 - 98 (25 - 30)
9	10	82	None	0.27	
12					
18		82		0.43	0.43

Table 21—Additional Charge Table - Ducted

Unit Size	Total Line Length ft		Additional Charge, oz/ft. Ft (m)			
	Min	Max	10-25 (3-8)	>25-82 (8-25)	>82-98 (25-30)	>98-213 (30-65)
9	10	82	None	0.27		
12						
18		98		0.43	0.43	
24						
36		213				0.43
48						

Table 22—Additional Charge Table - Floor Console

Unit Size	Total Line Length ft		Additional Charge, oz/ft. ft (m)	
	Min	Max	10 - 25 (3 - 8)	>25 - 82 (8 - 25)
9	10	82	None	0.27
12				

3 Reduction in capacity due to long lines can be calculated from the chart below.

SYSTEM EVACUATION AND CHARGING

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Never use the system compressor as a vacuum pump.

Refrigerant tubes and indoor coil should be evacuated using the recommended deep vacuum method of 500 microns. Always break a vacuum with dry nitrogen.

SYSTEM VACUUM AND CHARGE

Using Vacuum Pump

1 Completely tighten all flare nuts and connect manifold gage charge hose to a charge port of the low side service valve. (See Fig. 20).

2 Connect charge hose to vacuum pump.

3 Fully open the low side of manifold gage (see Fig. 21).

4 Start vacuum pump.

5 Evacuate using the triple evacuation method.

6 After evacuation is complete, fully close the low side of manifold gage and stop operation of vacuum pump.

7 The factory charge contained in the outdoor unit is good for up to 25 ft. (8m) of line length. For refrigerant lines longer than 25 ft (8m), add refrigerant as specified in the *ADDITIONAL REFRIGERANT CHARGE* table in this document.

8 Disconnect charge hose from charge connection of the low side service valve.

9 Fully open service valves B and A.

10 Securely tighten caps of service valves.

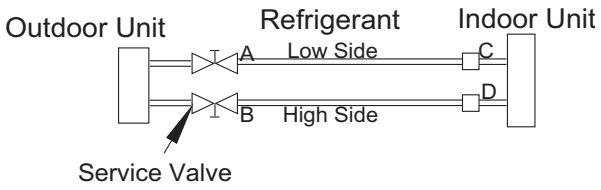


Fig. 20 – Service Valve

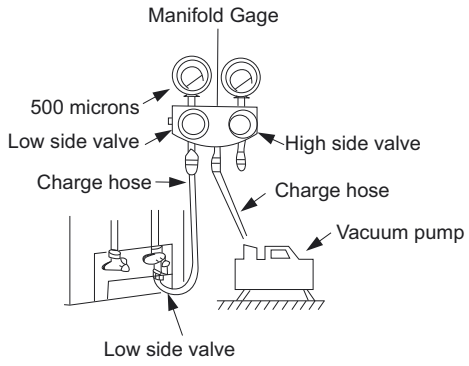


Fig. 21 – Manifold

Deep Vacuum Method

The deep vacuum method requires a vacuum pump capable of pulling a vacuum of 500 microns and a vacuum gage capable of accurately measuring this vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and liquid water. (see Fig. 22).

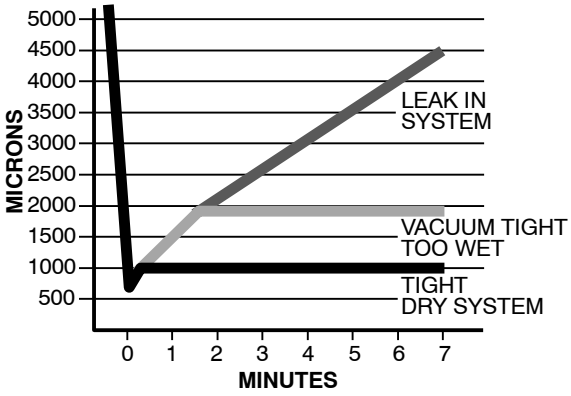


Fig. 22 – Deep Vacuum Graph

Triple Evacuation Method

The triple evacuation method should be used. Refer to Fig. 23 and proceed as follows:

1 Pump system down to 500 MICRONS of mercury and allow pump to continue operating for an additional 15 minutes.

2 Close service valves and shut off vacuum pump.

3 Connect a nitrogen cylinder and regulator to system and open until system pressure is 2 psig.

4 Close service valve and allow system to stand for 10 minutes. During this time, dry nitrogen will be able to diffuse throughout the system absorbing moisture.

5 Repeat this procedure as indicated in Fig. 23. System will then be free of any contaminants and water vapor.

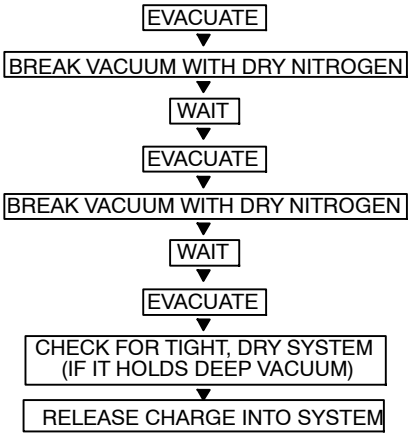


Fig. 23 – Triple Evacuation Method

Final Tubing Check

IMPORTANT: Check to be certain factory tubing on both indoor and outdoor unit has not shifted during shipment. Ensure tubes are not rubbing against each other or any sheet metal. Pay close attention to feeder tubes, making sure wire ties on feeder tubes are secure and tight.

Defrost

Defrost on heat pump units is controlled by the microprocessor and is initiated if either of the following conditions occur:

1 If the outdoor temperature, T4>32°F (0°C):

— The outdoor coil temperature (T3) has been lower than 37°F (3℃) for about 40 minutes. During that time, the coil temperature is lower than TCDI for more than 3 minutes.

2 If the outdoor temperature, T4＜32°F (0°C):

— If the conditions described above are met, the program judges if the evaporator coil temperature (T2) has decreased more than 41°F (5℃). When the evaporator coil temperature has decreased more than 41°F (5℃), the defrost mode starts.

3 At any value of outdoor ambient temperature (T4):

— If the machine runs with a condenser coil temperature lower than 37°F (3℃) for more than 120 minutes and the outdoor coil temperature (T3) has been lower than (TCDI+39°F) for more than 3 minutes, the machine enters the defrost mode.

Where: TCDI = --7°C = 19.4°F

Indoor fan running rules

Indoor fan speed can be set as high, medium, low, silent mode or auto mode. During all the fan speeds, the anti-cold-wind function is preferential. If the compressor stops caused by the room temperature rising, the indoor fan runs at super breeze. When the compressor is running, the indoor fan is controlled.

Outdoor fan running rules

In cooling mode the outdoor fan runs according to Fig 24.

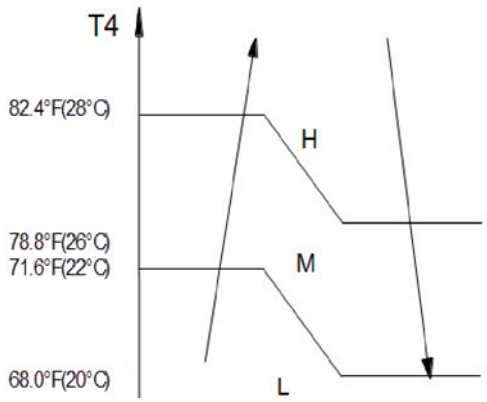


Fig. 24 – Outdoor fan running rules

Condition of defrosting:

----T4<32°F(0°C),

When the unit is running and the following two items are satisfied, the unit starts defrosting. The units run with T3<37.4°F(3°C) for 40 minutes and T3 keeps lower than TCDI°F for more than 3 minutes. The units run with T3<37.4°F(3°C) for 80 minutes and T3 keeps lower than TCDI 35.6°F(2°C) for more than 3 minutes.

---- T4 < 32°F(0°C).

If the 1st condition and 2nd condition items are satisfied, then the program judges if T2 has decreased more than 41°F(2°C). When T2 has decreased more than 41°F(2°C) enter the defrosting mode.

No matter what value T4 is, if the machine runs with T3 <37.4°F(3°C) for more than 120 minutes and T3 keeps lower than TCDI+39.2°F(4°C) for more than 3 minutes, the machine enters the defrosting mode no matter if T2 drops more than 41°F(5°C) or not.

Condition of ending defrosting:

If any one of the following items is satisfied, the defrosting mode finishes and the machine returns to the normal heating mode.

----T3 rises to be higher than TCDE 1°F

----T3 keeps to be higher than TCDE 4°F for 80 seconds.

----The machine has run for 10 minutes in defrosting mode.

Defrosting action:

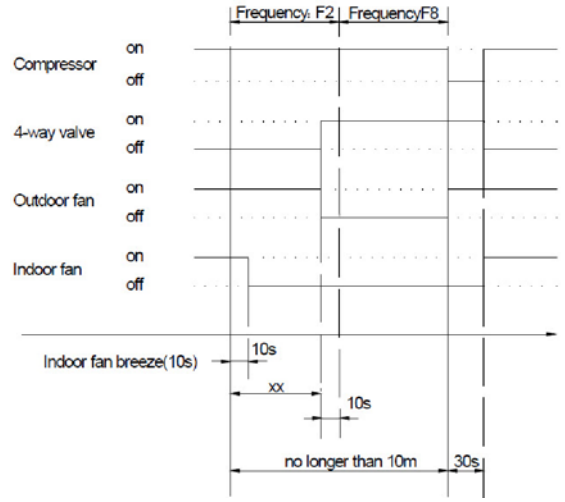


Fig. 25 – 9k,12k, 18k, 24k, 30k models

XX=60s

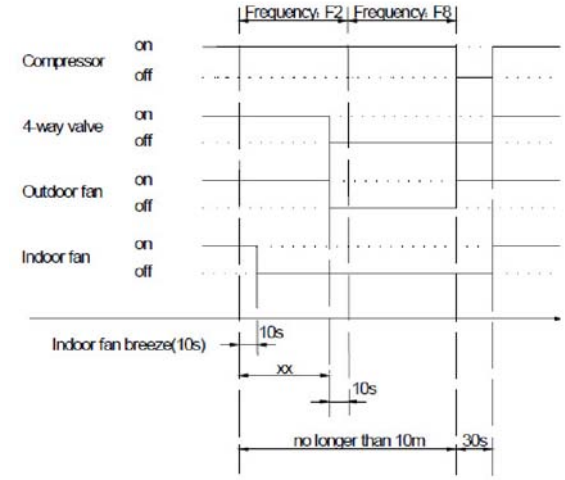


Fig. 26 – 9k,12k, 18k, 24k, 30k models

Evaporator coil temperature protection

----T2> TEH2°F, the compressor running frequency decreases to the lower level and runs for 20s. When the frequency decreases to F2 and the T2 is still over TEH 2°F for 3 minutes, the compressor stops.

AUTO MODE

In the Auto mode, the temperature can be set to values between 62~86°F (17~30℃). In this mode, the machine chooses the Cooling, Heating or Fan Only mode according to ΔT.

NOTE: ΔT =T1-Ts, where T1 represents the indoor room temperature and Ts represents the set temperature.

Table 23—Auto Mode

ΔT=T1-Ts	Running mode
ΔT＞2°F	Cooling
-1<ΔT≤2°F	Fan-only
ΔT≤-2°F	Heating

The indoor fan runs at an automatic fan speed for each running mode. The louver also operates depending in relevant mode taking place.

If the machine switches mode between heating and cooling, the compressor stops for 15 minutes and then choose a mode according to ΔT.

If a new set temperature is commanded, the system chooses a running mode according to ΔT.

FORCED OPERATION FUNCTION

When the machine is off, pressing the manual button carries the machine into the forced auto mode. Press the button once again, within 5 seconds, the machine enters the forced cooling mode.

In Forced Auto, Forced Cooling or any other operation mode, press the manual button to turn off the machine.

When in this mode, all general protections are available.

Forced cooling mode:

The compressor runs at F2 frequency and indoor fan runs as breeze.

After running for 30 minutes, the machine will turn to auto mode with a 75°F (24℃) set temperature.

Forced auto mode:

The action of forced auto mode is the same as normal auto mode with a 75°F (24°C) set temperature.

TIMER FUNCTION

Timing range is 24 hours.

The timer function will not change the system's current operation mode.

The setting time is relative time.

Timer on

The machine turns on automatically when reaching the set time.

Timer off

The machine turns off automatically when reaching the setting time.

Timer on/off

The machine turns on automatically when reaching the set "on" time, and turns off automatically when reaching the set "off" time.

The timer function does not change the AC current operation mode. Suppose AC is off now, it will not start up first after setting the "timer off" function. And when reaching the setting time, the timer LED will turn off and the AC running mode will not change.

SLEEP MODE FUNCTION

Operation time in sleep mode is 7 hours. After 7 hours the system turns off.

Operation process in sleep mode is as follow:

SLEEP MODE - COOLING

When in cooling mode, the set temperature rises 1.8°F (1°C) (up to a maximum 86°F (30°C)) every one hour. Two hours later the set temperature stops rising and indoor fan is fixed at low speed.

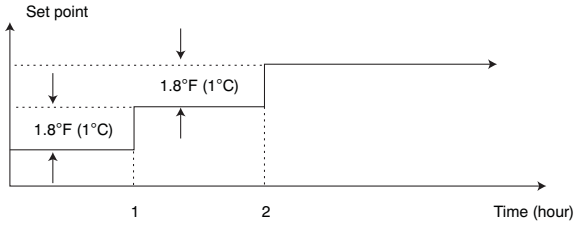
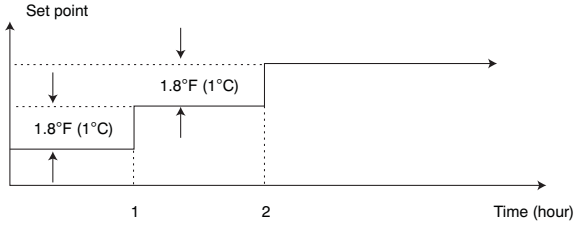


Fig. 27 – Sleep Mode - Heating

When in heating mode, the set temperature decreases 1.8°F (1°C) (down to a minimum 62°F (17°C)) every one hour. Two hours later the set temperature stops rising and indoor fan is fixed at low speed.

NOTE: Anti-cold wind function has the priority.



Timer setting is available.

When the user uses timer off function in sleep mode (or sleep function in timer off mode), if the timing is less than 7 hours, the sleep function cancels when the setting time is reached. If the timing is more than 7 hours, the machine will not stop until it reaches the set time in sleep mode.

AUTO-RESTART FUNCTION

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions present previous to the power failure. The unit will automatically resume to the previous operation settings (not including swing function) 3 minutes after the power returns.

If the memorization condition is forced cooling mode, the unit will run in cooling mode for 30 minutes and turn to auto mode at a 75°F (24°C) set temp.

If unit is off before power off and unit is required to start up now, the compressor has a 1 minute delay when powered on. Other conditions, the compressor will have 3 minutes delay when restarts.

If the equipment was off before the power went off, and it is required to start up after this power failure, the compressor has a 1 minute delay when powering on. In other conditions, the compressor has a 3 minutes delay at re-start.

Follow me

1 If the indoor PCB receives the signal which results from pressing the FOLLOW ME button on remote controller, the buzzer emits a sound and this indicates the follow me function is initiated. But when the indoor PCB receives signal which sent from remote controller every 3 minutes, the buzzer will not respond. When the unit is running with follow me function, the PCB controls the unit according to the temperature from follow me signal, and the temperature collection function of room temperature sensor will be shielded, but the error detective function of room temperature sensor will be still valid.

2 When the follow me function is available, the PCB controls the unit according to the room temperature from the remote controller and the setting temperature.

3 The PCB will take action to the mode change information from remote controller signal, but it will not affected by the setting temperature.

4 When the unit is running with follow me function, if the PCB does not receive any signal from remote controller for 7 minutes or pressing FOLLOW ME button again, the follow me function will be turned off automatically, and the temperature controls the unit according to the room temperature detected from its own room temperature sensor and setting temperature.

Self Clean

For heat pump models which are provided with this function, after running in cooling or drying mode, if the user press “Self Clean” button on remote controller, indoor unit runs in fan only mode for 13 minutes, then low heat operation and finally in fan only again. This function can keep the inside of indoor unit dry and prevent breeding of mold.

Refrigerant Leakage Detection

With this new technology, the display area shows “EC” when the outdoor unit detects refrigerant leakage. This feature is only available in the cooling mode for 1 to 1 systems.

T2: indoor coil temp. Tcool: sample temp. of T2 when the compressor starts. During the first 5 minutes after compressor’s start, if the situation that T2 < Tcool-3.6° F does not last for 4 seconds continuously, the system records suspected refrigerant leakage once, and the compressor stops.

If the above case happened three times continuously, the system judges refrigerant leakage. The indoor unit indicates error code “EC” and the unit turns off automatically.

Refrigerant leakage count resets under following situation:

During the first 5 minutes after compressor’s start, the situation that T2 < Tcool-3.6° F lasts for 4 seconds continuously.

Evaporator anti-freeze protection in cooling mode.

Non-cooling mode.

Louver Position Memory Function

When starting the unit again after shutting down, its louver restores to the angle originally set by the user, but the precondition is that the angle must be within the allowable range, if it exceeds, it memorizes the maximum angle of the louver. During operation, if the power fails the louver restores to the default angle.

46°F (8°C) Heating (heating setback)

In heating operation, the preset temperature of the air conditioner can be as low as 46°F, which keeps the room temperature steady at 46°F and prevents household pipes from freezing when the house is unoccupied for a long time in severe cold weather.

Silence operation

Press the “silence” button on remote controller to initiate SILENCE function. When the Silence function is activated, the compressor running frequency remains lower than F2 and the indoor unit supplies faint breeze, which reduces the noise to the lowest level and create a quiet and comfortable room for you.

TROUBLESHOOTING

This section provides the required flow charts to troubleshoot problems that may arise.

NOTE: **Information required in the diagnoses can be found either on the wiring diagrams or in the appendix.**

Required Tools:

The following tools are needed when diagnosing the units:

- Digital multimeter
- Screw drivers (Phillips and straight head)
- Needle-nose pliers
- Refigeration gauges

Recommended Steps

1 Refer to the diagnostic hierarchy charts below and determine the problem at hand.

2 Go to the chart listed in the diagnostic hierarchy and follow the steps in the chart for the selected problem.

For ease of service, the systems are equipped with diagnostic code display LED's on both the indoor and outdoor units. The outdoor diagnostic display is on the outdoor unit board and is limited to very few errors. The indoor diagnostic display is a combination of flashing LED's on the display panel on the front of the unit. If possible always check the diagnostic codes displayed on the indoor unit first. The diagnostic codes for the indoor and outdoor units are listed in the appendix.

Problems may occur that are not covered by a diagnostic code, but are covered by the diagnostic flow charts. These problems are typical air conditioning mechanical or electrical issues that can be corrected using standard air conditioning repair techniques.

For problems requiring measurements at the control boards, note the following:

1 Always disconnect the main power.

2 When possible check the outdoor board first.

3 Start by removing the outdoor unit top cover.

4 Reconnect the main power

5 Probe the outdoor board inputs and outputs with a digital multi-meter referring to the wiring diagrams.

6 Connect the red probe to hot signal and the black probe to the ground or negative.

7 Note that some of the DC voltage signals are pulsating voltages for signal. this pulse should be rapidly moving at all times when there is a signal present.

8 If it is necessary to check the indoor unit board you must start by disconnecting the main power.

9 Next remove the front cover of the unit and then control box cover.

10 Carefully remove the indoor board from the control box, place it face up on a plastic surface (not metal).

11 Reconnect the main power and repeat steps 5,6, and 7.

12 Disconnect main power before reinstalling board to avoid shock hazard and board damage.

Safety

Electricity power is still kept in capacitors even the power supply is shut off. Do not forget to discharge the electricity power in capacitor.

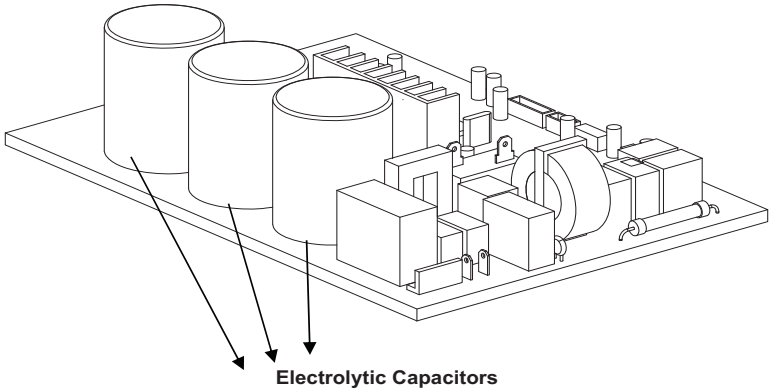


Fig. 28 – Capacitors

For other models, connect discharge resistance (approx.100Ω 40W) or soldering iron (plug) between **+**, **-** terminals of the electrolytic capacitor on the contrary side of the outdoor PCB.

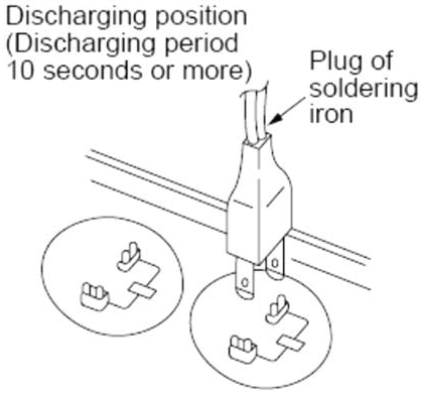


Fig. 29 – Discharging Position

NOTE: Fig. 29 is for reference only.

INDOOR UNIT DIAGNOSTIC GUIDES

Table 24—Indoor Unit Error Display

Operation Lamp	Timer Lamp	Display	LED Status
☆1 time	X	E0	Indoor unit EEPROM error
☆ 2 times	X	E1	Communication malfunction between indoor and outdoor units.
☆4 times	X	E3	Indoor fan speed has been out of control
☆5 times	X	E4	Indoor room temperature sensor T1 open circuit or short circuit
☆6 times	X	E5	Evaporator coil temperature sensor T2 open circuit or short circuit
☆7 times	X	EC	Refrigerant leakage detection
☆8 times	X	EE	Water-level alarm malfunction
☆1 time	O	F0	Current overload protection
☆2 times	O	F1	Open circuit or short circuit of outdoor ambient temperature sensor T4
☆3 times	O	F2	Open circuit or short circuit of condenser coil temperature sensor T3
☆4 times	O	F3	Open circuit or short circuit of Compressor discharge temperature sensor T5
☆5 times	O	F4	Outdoor unit EEPROM error
☆6 times	O	F5	Outdoor fan speed has been out of control
☆7 times	O	F6	T2B sensor error
☆8 times	O	F7	Lifting-panel communication error
☆9 times	O	F8	Lifting-panel malfunction
☆10 times	O	F9	Lifting-panel is not closed
☆1 time	☆	P0	IPM malfunction
☆2 times	☆	P1	Over voltage or over low voltage protection
☆3 times	☆	P2	High temperature protection of compressor top
☆4 times	☆	P3	Outdoor low temperature protection
☆5 times	☆	P4	Inverter compressor drive error
☆6 times	☆	P5	Mode conflict
☆7 times	☆	P6	Compressor low-pressure protection
☆8 times	☆	P7	Outdoor IGBT temperature sensor error

O (light) X (off) ☆ (flash)

Outdoor Unit Error Display

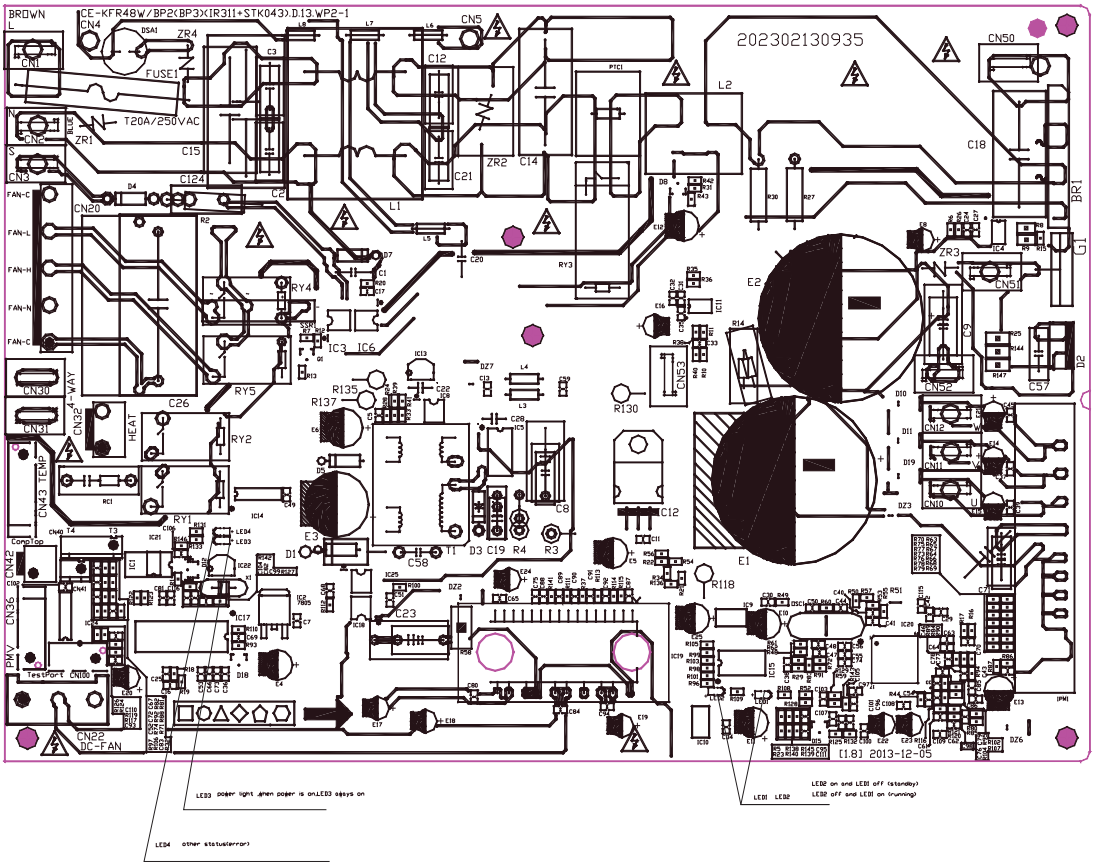


Fig. 30 – Outdoor Unit Error Display

Table 25—Outdoor Unit SIZES 9 - 24 Error Display

No.	Problems	LED2 (Green)	LED1 (Red)	IU Display
1	Standby for normal	O	X	
2	Operation normally	X	O	
3	Compressor drive board EEPROM error	O	☆	E5
4	IPM malfunction or IGBT over-strong current protection	☆	X	P0
5	Over voltage or too low voltage protection	O	O	P1
6	Inverter compressor drive error	X	☆	P4
7	Inverter compressor drive error	☆	O	P4
8	Communication malfunction between main control board and driver board	☆	☆	P4

Table 26—Outdoor Unit SIZES 36 - 48 Error Display

No	Problems Error Code	Error Code
1	Communication malfunction between indoor and outdoor units.	E1
2	Protection of over-current	F0
3	Open circuit or short circuit of outdoor ambient temperature sensor T4	F1
4	Open circuit or short circuit of condenser coil temperature sensor T3	F2
5	Open circuit or short circuit of Compressor discharge temperature sensor T5	F3
6	Outdoor unit EEPROM error	F4
7	Outdoor fan speed has been out of control	F5
8	IPM malfunction	P0
9	Over voltage or over low voltage protection	P1
10	High temperature protection of compressor top	P2
11	Outdoor low temperature protection	P3
12	Inverter compressor drive error	P4
13	High temperature protection of indoor coil in heating	J0
14	Outdoor temperature protection of outdoor coil in cooling	J1
15	Discharge temperature protection	J2
16	Protection of active PFC module	J3
17	Communication error between control board and IPM board	J4
18	Hi-pressure switch protection	J5
19	Low-pressure switch protection	J6
20	Outdoor IGBT temperature sensor error	P7
21	AC voltage protection	J8

Outdoor Check Function

Table 27—Outdoor Check Function

N	Display	Remark
00	Normal Display	Display running frequency, running state or malfunction code
01	Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “5.0”, it means the capacity demand is 15. the digital display tube show “60”,it means the capacity demand is 6.0).
02	Amendatory capacity demand code	
03	The frequency after the capacity requirement transfer	
04	The frequency after the frequency limit	
05	The frequency of sending to 341 chip	
06	Indoor unit evaporator outlet temp.(heating T2 cooling T2B)	If the temp. is lower than 0 degree, the digital display tube will show “0”. If the temp. is higher than 70 degree, the digital display tube will show “70”.
07	Condenser pipe temp.(T3)	If the temp. is lower than -9 degree, the digital display tube will show “-9”.If the temp. is higher than 70 degree, the digital display tube will show “70”. If the indoor unit is not connected, the digital display tube will show: “- - ”.
08	Outdoor ambient temp.(T4)	
09	Compressor discharge temp.(T5)	The display value is between 13~129 degree. If the temp. is lower than 13 degree, the digital display tube will show “13”.If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “0.5”,it means the compressor discharge temp. is 105 degree. the digital display tube show “1.6”, it means the compressor discharge temp. is 116 degree).
10	AD value of current	The display value is hex number.
11	AD value of voltage	
12	Indoor unit running mode code	Off:0, Fan only 1,Cooling:2, Heating:3
13	Outdoor unit running mode code	Off:0, Fan only 1,Cooling:2, Heating:3, Forced cooling:4
14	EXV open angle	Actual data/4. If the value is higher than 99, the digital display tube will show single digit and tens digit. For example, the digital display tube show “2.0”, it means the EXV open angle is 120x4=480p.)
15	Frequency limit symbol	Bit7 Frequency limit caused by IGBT radiator Bit6 Frequency limit caused by PFC Bit5 Frequency limit caused by T4. Bit4 Frequency limit caused by T2. Bit3 Frequency limit caused by T3. Bit2 Frequency limit caused by T5. Bit1 Frequency limit caused by current Bit0 Frequency limit caused by voltage The display value is hex number. For example, the digital display tube show 2A, then Bit5=1, Bit3=1, Bit1=1. It means frequency limit caused by T4, T3 and current.
16	DC fan motor speed	
17	IGBT radiator temp.	The display value is between 30~120 degree. If the temp. Is lower than 30 degree, the digital display tube will show “30”.If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “0.5”, it means the IGBT radiator temp. is 105 degree. the digital display tube show “1.6”,it means the IGBT radiator temp. is 116 degree).
18	Indoor unit number	The indoor unit can communicate with outdoor unit well. General:1, Twins:2
19	Evaporator pipe temp. T2 of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show “0”.If the temp. is higher than 70 degree, the digital display tube will show “70”. If the indoor unit is not connected, the digital display tube will show: “--”.
20	Evaporator pipe temp. T2 of 2# indoor unit	
21	Evaporator pipe temp. T2 of 3# indoor unit	
22	1# Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “5.0”,it means the capacity demand is 15. the digital display tube show “60”,it means the capacity demand is 6.0). If the indoor unit is not connected, the digital display tube will show: “--”.
23	2# Indoor unit capacity demand code	
24	3# Indoor unit capacity demand code	
25	Room temp. T1 of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show “0”. If the temp. is higher than 70 degree, the digital display tube will show “70”. If the indoor unit is not connected, the digital display tube will show: “--”.
26	Room temp. T1 of 2# indoor unit	
27	Average room temp. T1	
28	Reason of stop	
29	Evaporator pipe temp. T2B of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show “0”. If the temp. is higher than 70 degree, the digital display tube will show “70”. If the indoor unit is not connected, the digital display tube will show: “--”.
30	Evaporator pipe temp. T2B of 2# indoor unit	

Diagnosis and Solution

EEPROM error diagnosis and solution (E0/F4)

Error Code	E0/F4
Malfunction decision conditions	Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.
Supposed causes	• Installation mistake • PCB faulty

Troubleshooting:

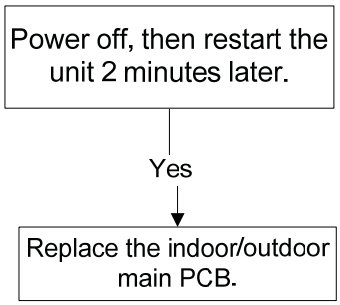


Fig. 31 – Troubleshooting

Fig. 32 – Indoor PCB

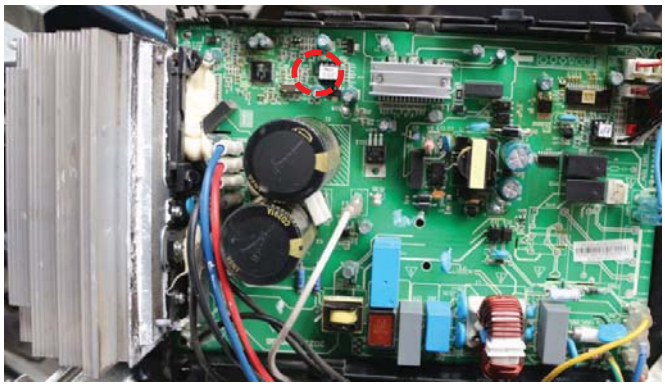


Fig. 33 – Outdoor PCB

NOTE: The two photos above are for reference only and may differ from the items on your unit.

Communication malfunction between indoor and outdoor units diagnosis and solution (E1)

Error Code	**E1**
Malfunction decision conditions	Indoor unit does not receive the feedback from outdoor unit during 110 seconds and this condition happens four times continuously.
Supposed causes	• Wiring mistake • Indoor or outdoor PCB faulty

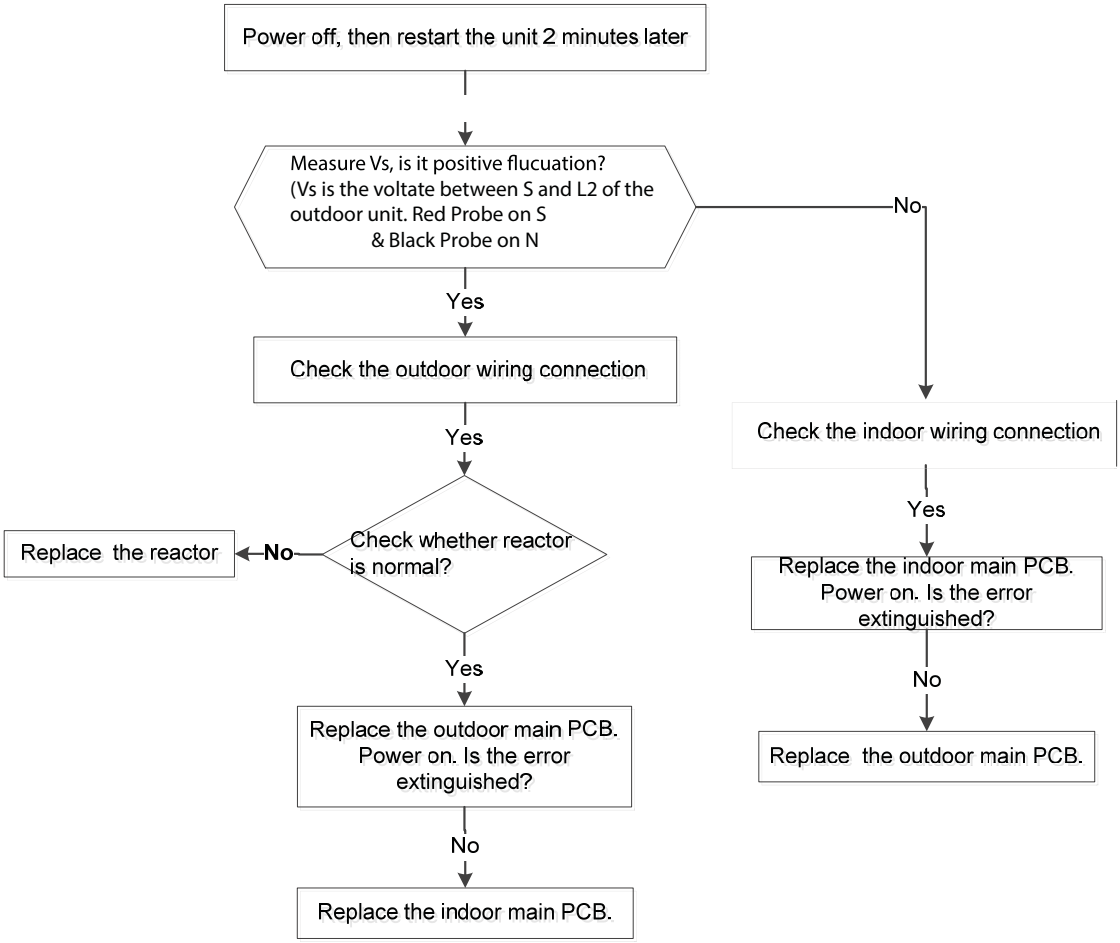
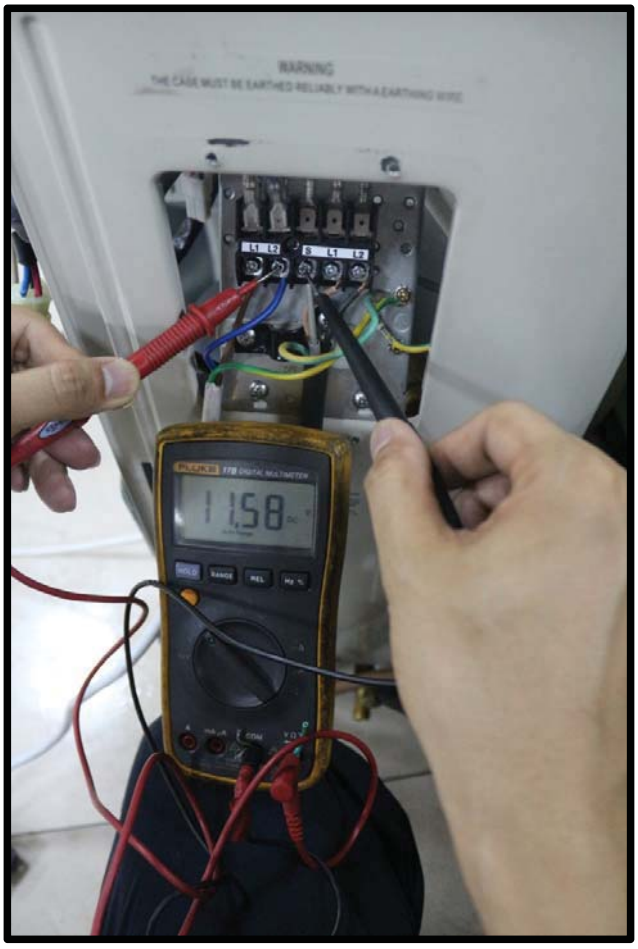


Fig. 34 – Troubleshooting



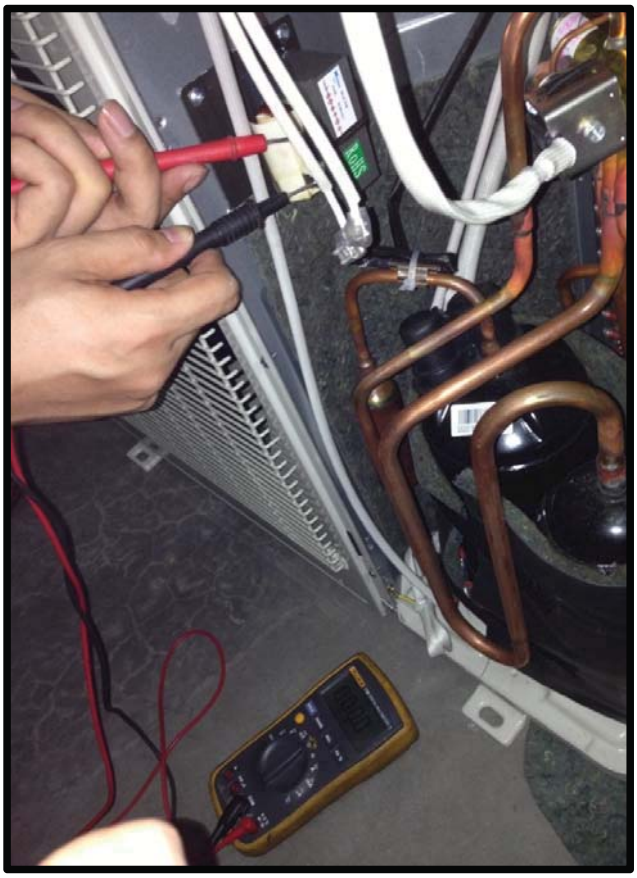
Remark:
Use a multimeter to test the DC voltage between L2 port and S port of outdoor unit. The red probe of the multimeter connects with L2 port while the black pin is for S port.

When AC is normal running, the voltage will move alternately between -50V to 50V.

If the outdoor unit has malfunction, the voltage will move alternately with positive value.

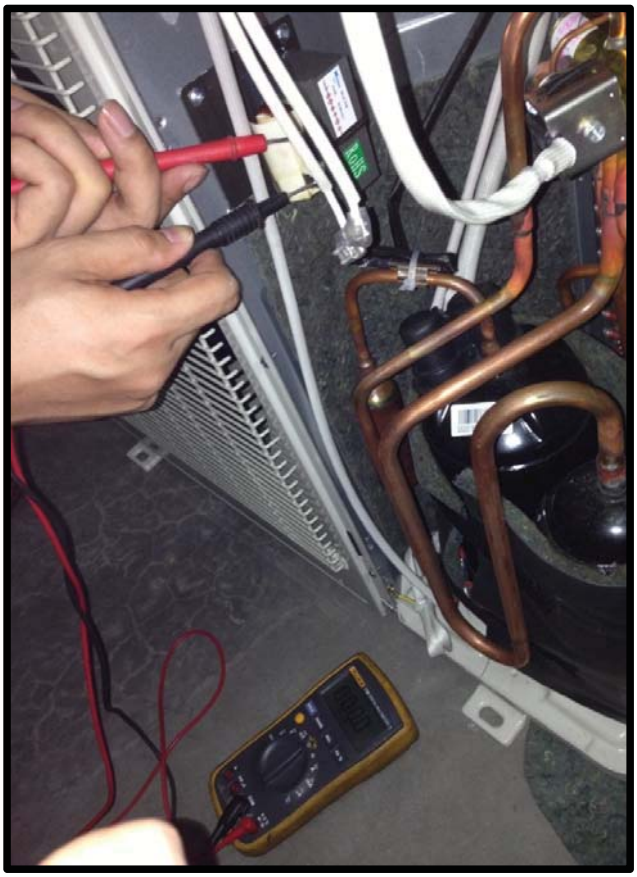
While if the indoor unit has malfunction, the voltage will be a certain value.

Fig. 35 – Test the DC voltage



Remark:
Use a multimeter to test the resistance of the reactor which does not connect with capacitor.
The normal value should be around zero ohm. Otherwise, the reactor must have malfunction and need to be replaced.

Fig. 36 – Test the resistance



Remark:
Use a multimeter to test the resistance of the reactor which does not connect with capacitor.
The normal value should be around zero ohm. Otherwise, the reactor must have malfunction and need to be replaced.

Fig. 37 – Test the resistance

Error Code	**E3**
Malfunction decision conditions	When indoor fan speed keeps too low (300RPM) for certain time, the unit will stop and the LED will display the failure.
Supposed causes	• Wiring mistake • Fan ass'y faulty • Fan motor faulty • PCB faulty

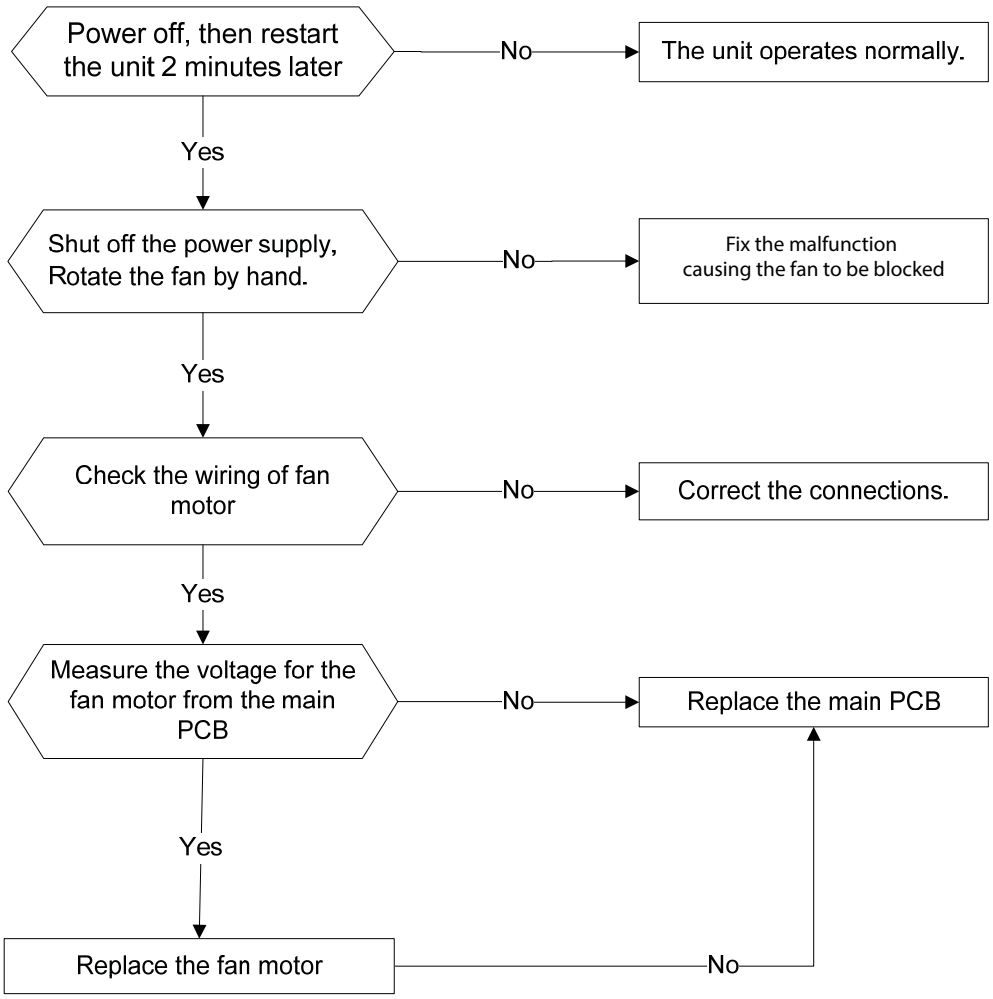


Fig. 38 – Troubleshooting

Index 1:

1 Indoor DC fan motor(control chip is inside fan motor)

Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must have problems and need to be replaced.

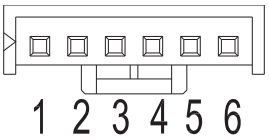


Fig. 39 – Indoor DC fan motor

DC motor voltage input and output

No.	Color	Signal	Voltage
1	Red	Vs/Vm	200~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5~16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5~16.5V

Open circuit or short circuit of temperature sensor diagnosis and solution
(E4/E5/F1/F2/F3)

Error Code	**E4/E5/F1/F2/F3**
Malfunction decision conditions	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure.
Supposed causes	• Wiring mistake • Sensor faulty

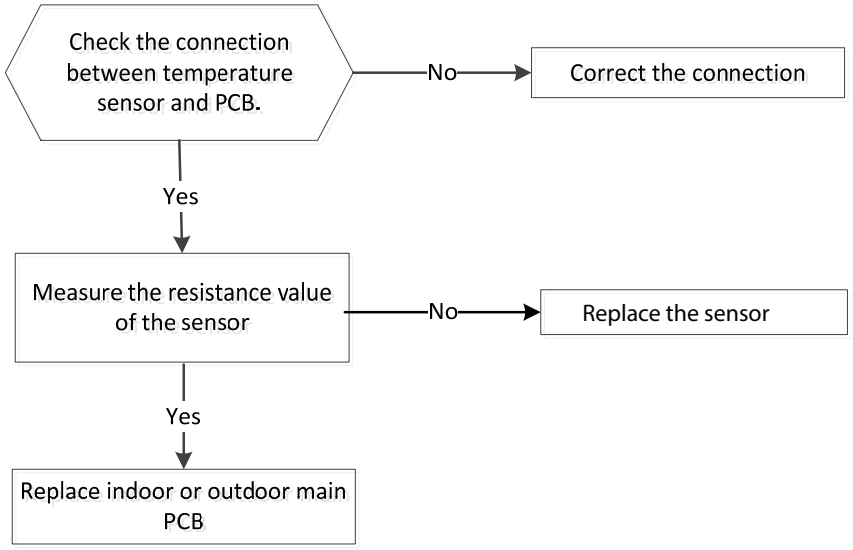


Fig. 40 – Troubleshooting

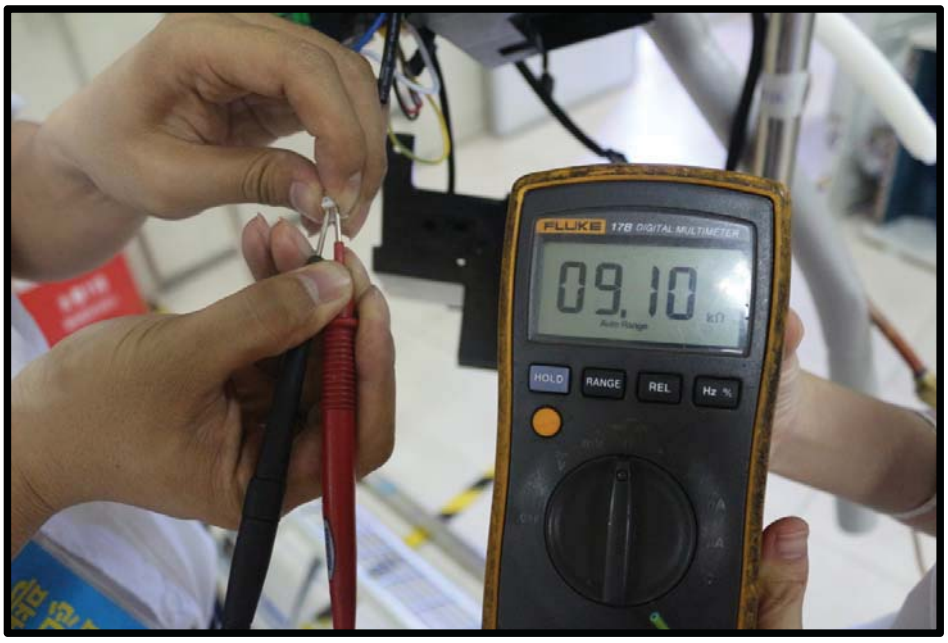


Fig. 41 – Temperature sensor diagnosis

Refrigerant Leakage Detection diagnosis and solution (EC)

Error Code	EC
Malfunction decision conditions	Define the evaporator coil temp.T2 of the compressor just starts running as Tcool. In the beginning 5 minutes after the compressor starts up, if T2 35 Tcool 35°F does not keep continuous 4 seconds and this situation happens 3 times, the display area will show “EC” and AC will turn off.
Supposed causes	• T2 Sensor faulty • Indoor FCB faulty • System problems, such as leakage or blocking

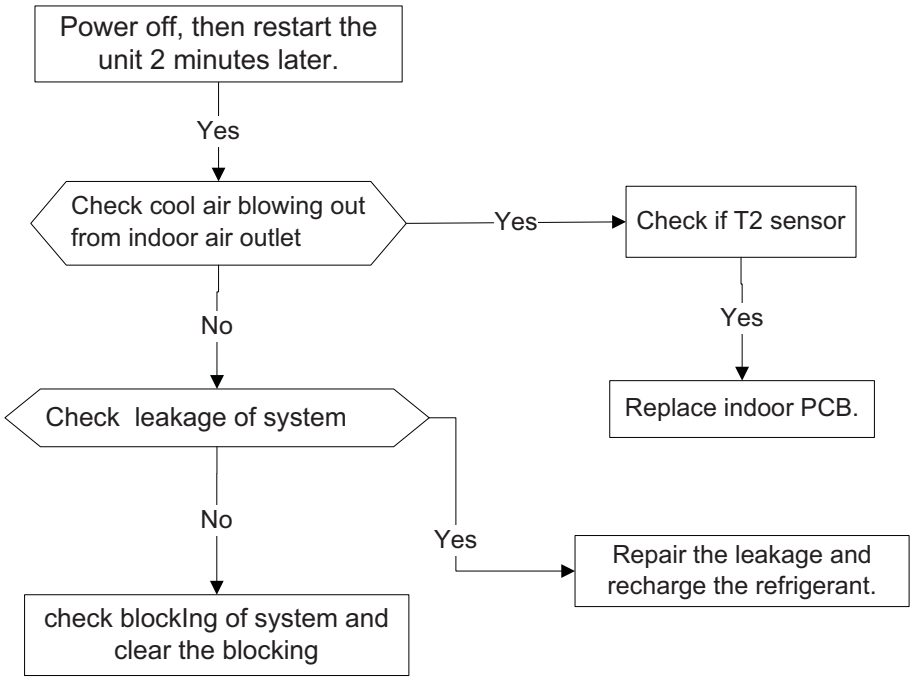


Fig. 42 – Troubleshooting

Water-level alarm malfunction diagnosis and solution

Error Code	**EE**
Malfunction decision conditions	If the sampling voltage is not 5V, the LED will display the failure.
Supposed causes	• Wiring mistake • Water-level switch faulty • Water pump faulty • Indoor PCB faulty

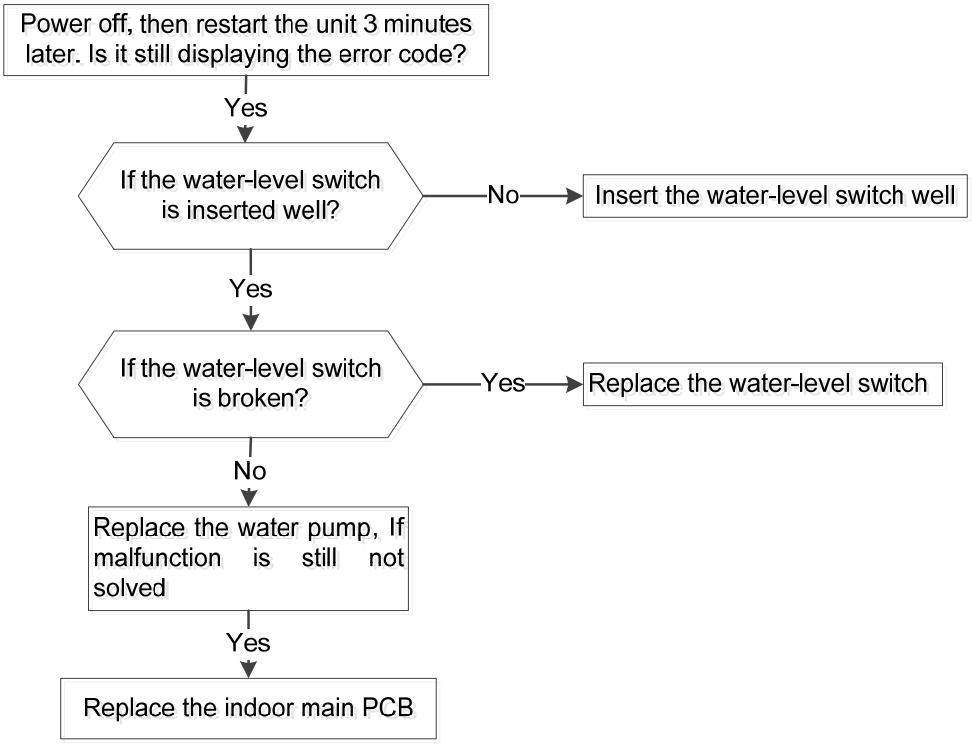


Fig. 43 – Troubleshooting

IPM malfunction or IGBT over-strong current protection diagnosis and solution (P0)

Error Code	**P0**
Malfunction decision conditions	When the voltage signal that IPM send to compressor drive chip is abnormal, the display LED will show “P0” and AC will turn off.
Supposed causes	Wiring mistake; IPM malfunction; Outdoor fan ass’y faulty Compressor malfunction; Outdoor PCB faulty

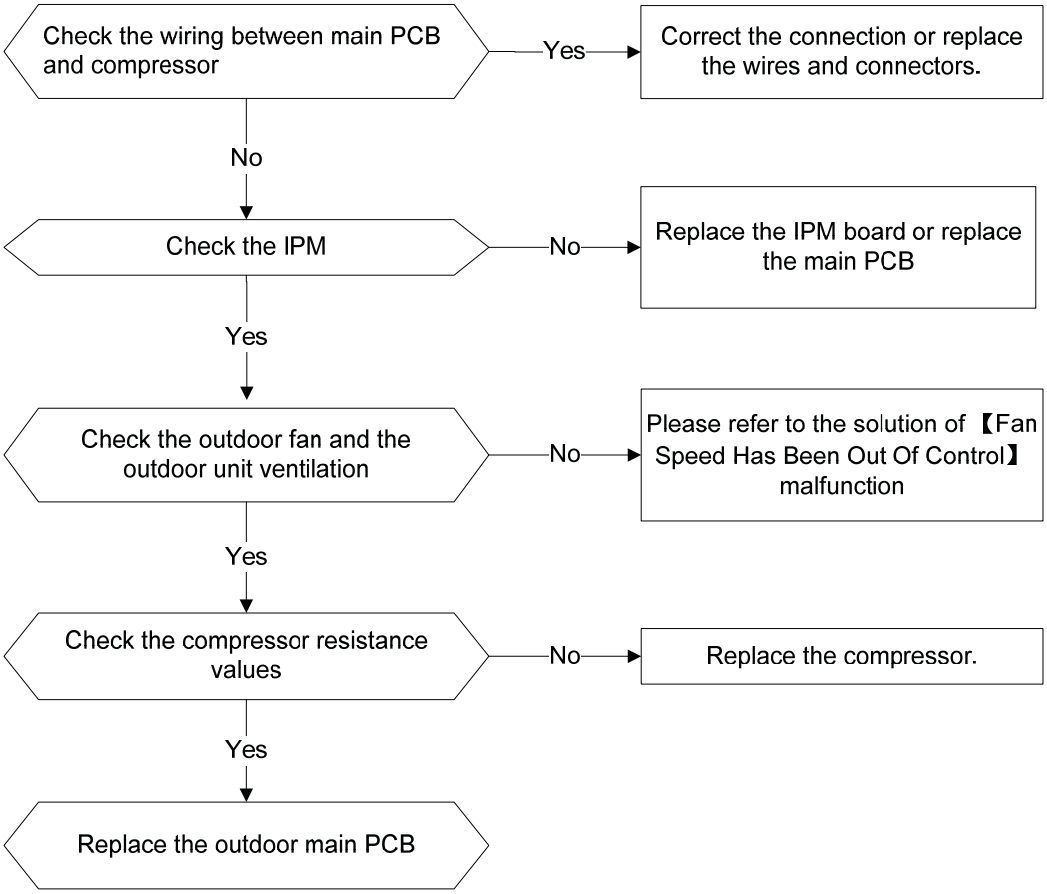
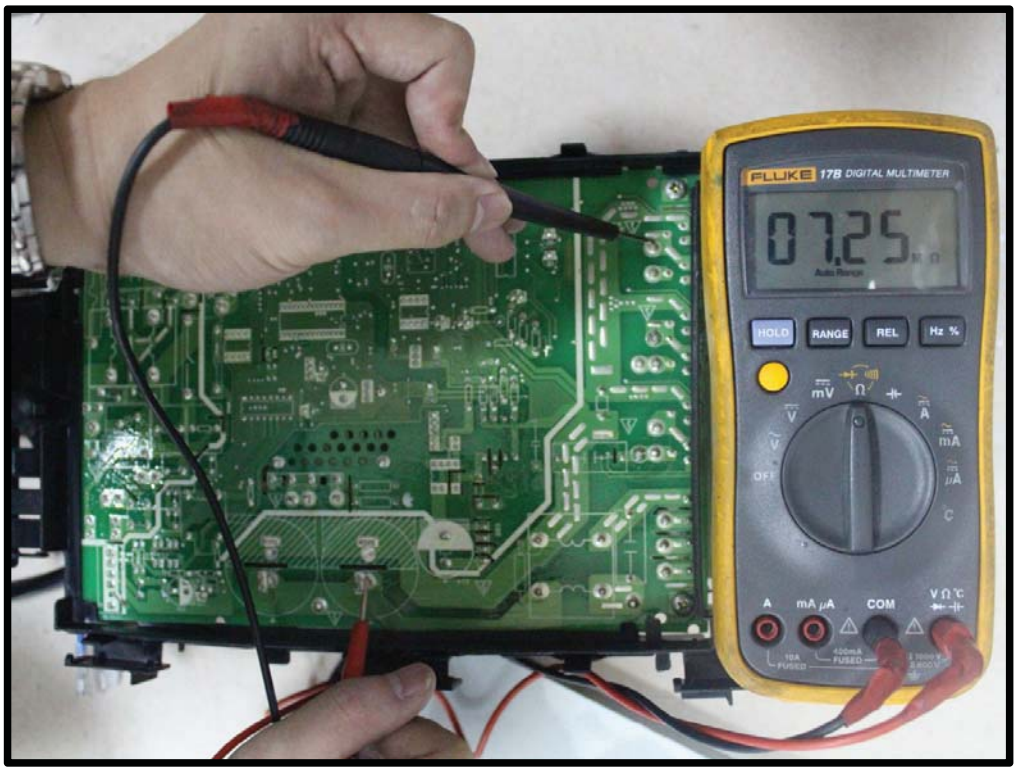
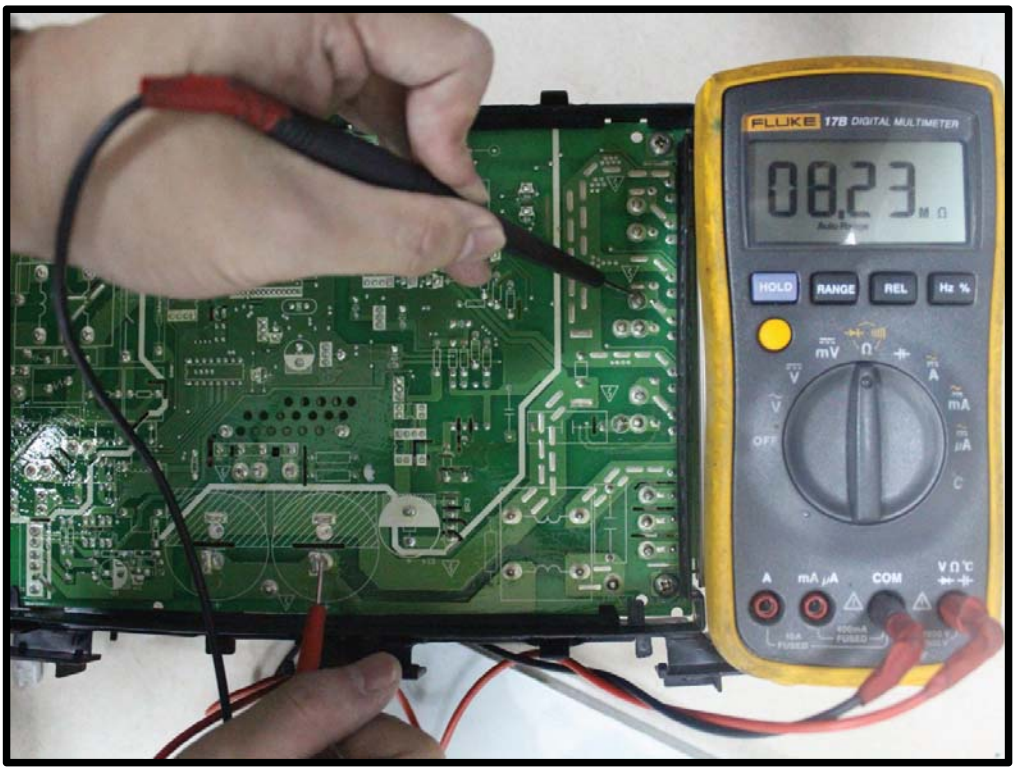


Fig. 44 – Troubleshooting



P-U

Fig. 45 – P-U



P-V

Fig. 46 – P-V

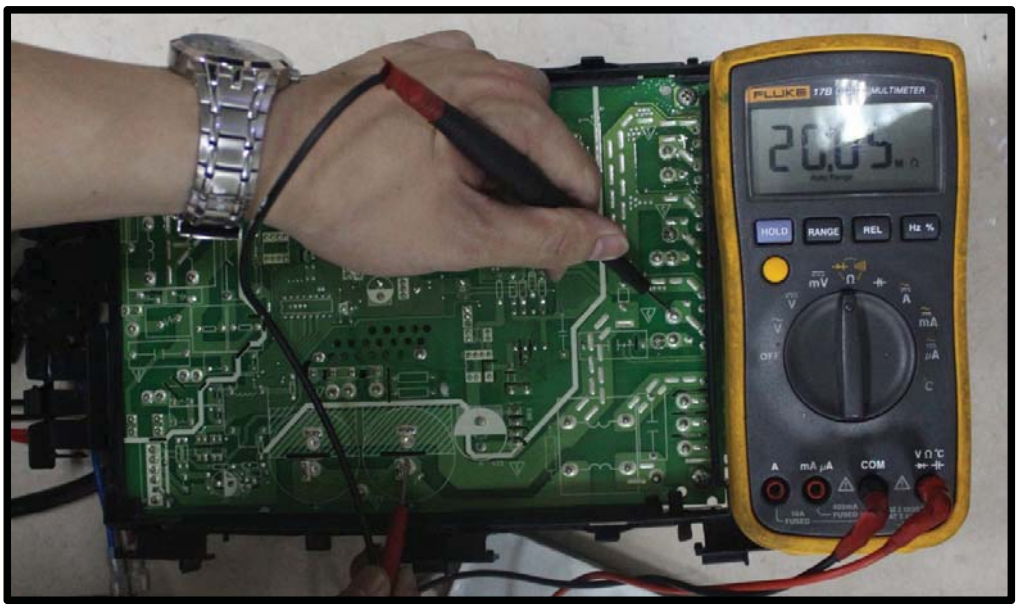


Fig. 47 – P-W

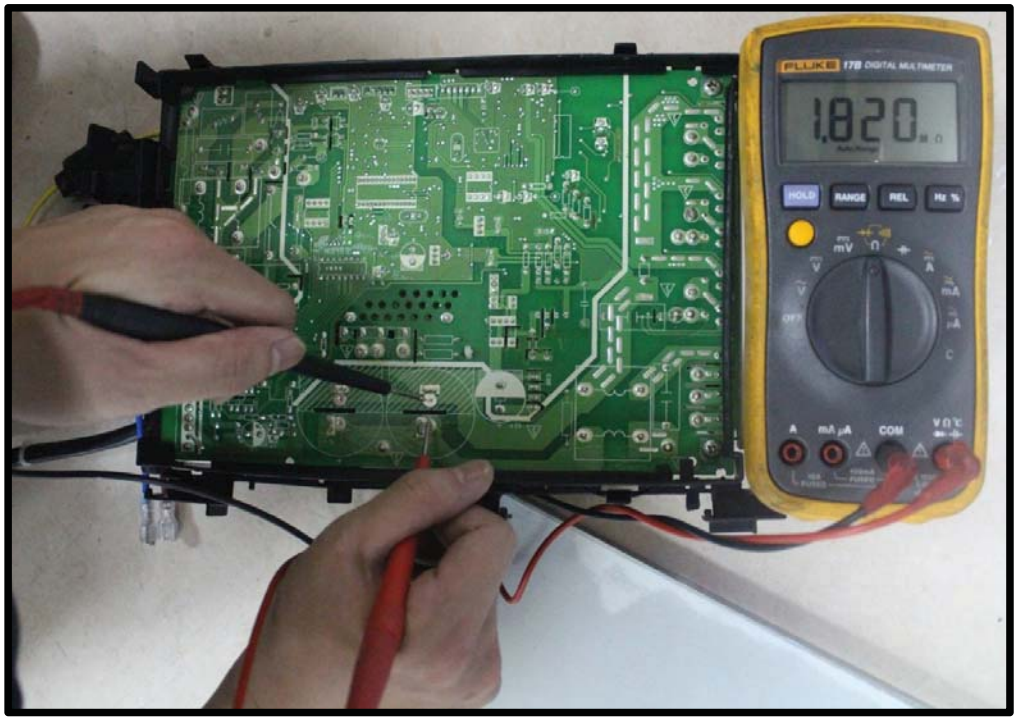


Fig. 48 – P-N

Over voltage or too low voltage protection diagnosis and solution (P1)

Error Code	**P1**
Malfunction decision conditions	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.
Supposed causes	• Power supply problems • System leakage or block • PCB faulty

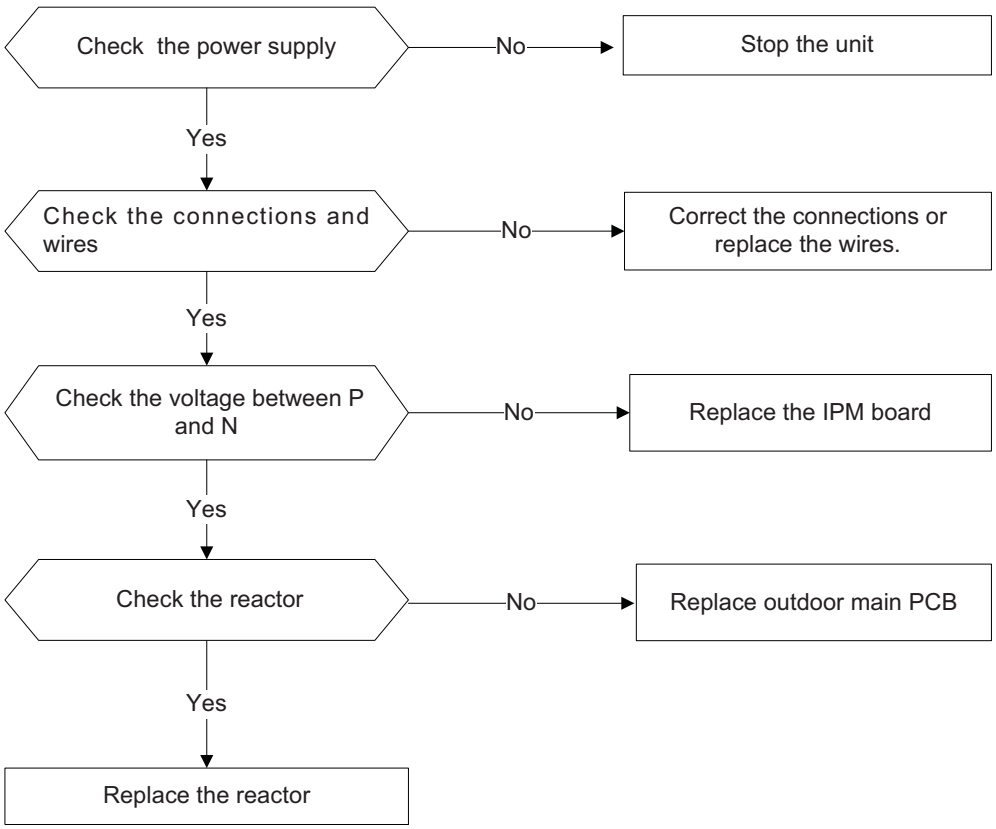


Fig. 49 – Troubleshooting

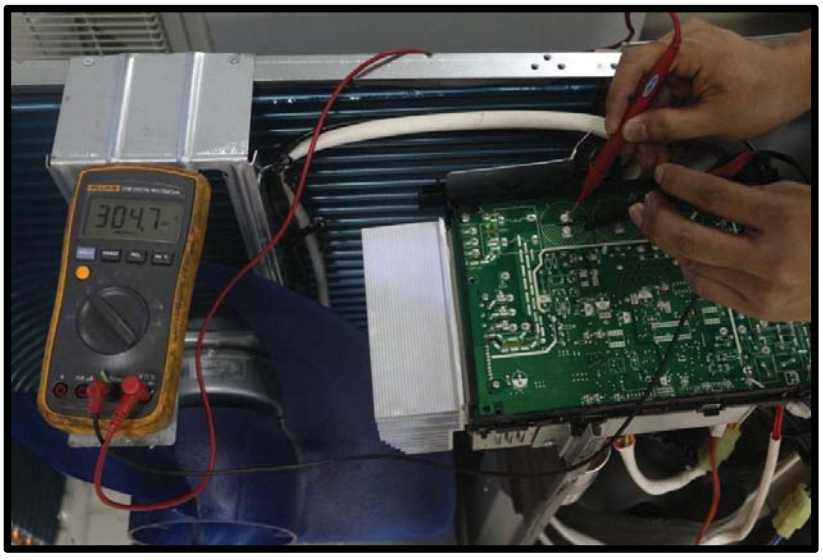


Fig. 50 – Measure the DC voltage

Remark:
Measure the DC voltage between P and N port. The normal value should be around 310V.

High temperature protection of compressor top diagnosis and solution (P2)

Error Code	**P2**
Malfunction decision conditions	If the sampling voltage is not 5V, the LED will display the failure.
Supposed causes	• Power supply problems • System leakage or block • PCB faulty

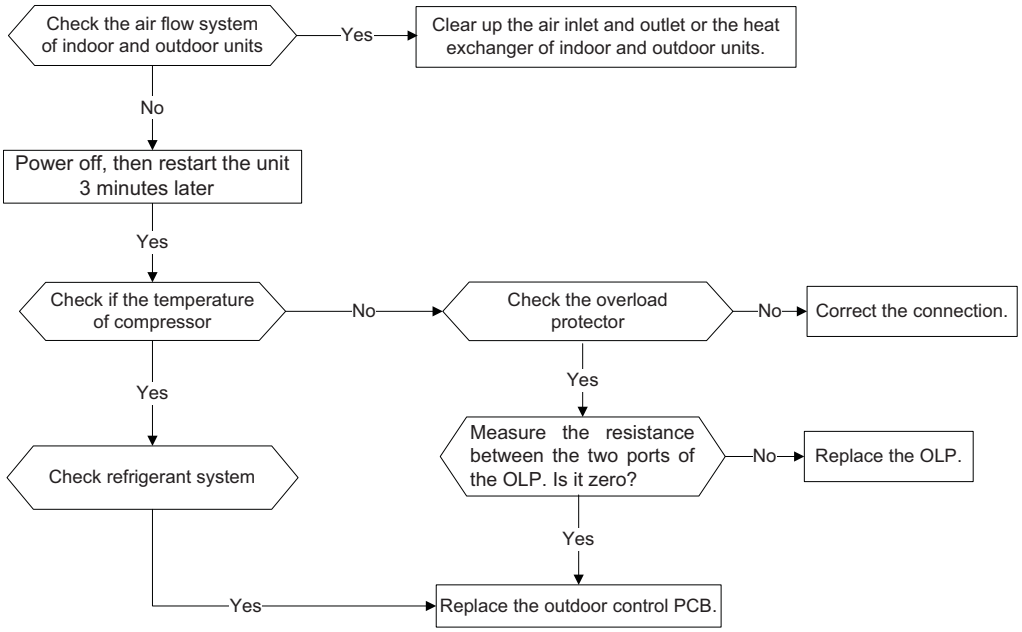


Fig. 51 – Troubleshooting

Inverter compressor drive error diagnosis and solution(P4)

Error Code	P4
Malfunction decision conditions	An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection.
Supposed causes	• Wiring mistake; IPM malfunction; Outdoor fan ass'y faulty • Compressor malfunction; Outdoor PCB faulty

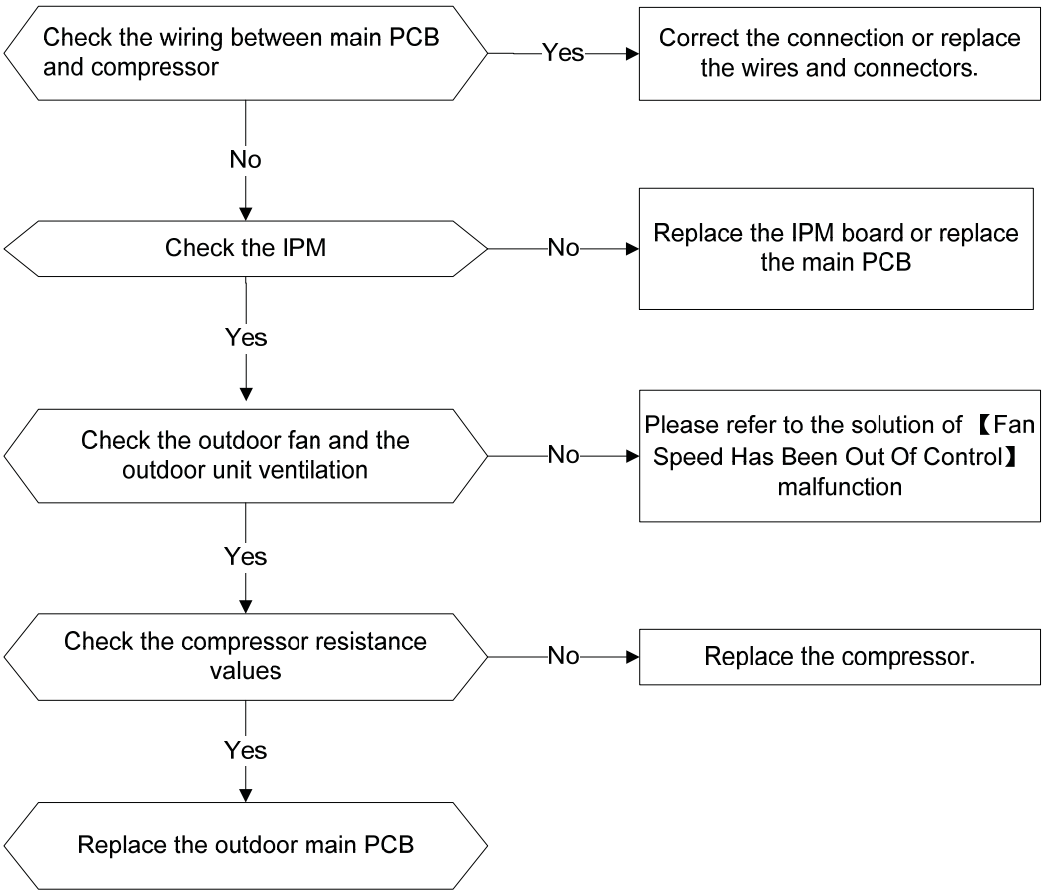


Fig. 52 – Troubleshooting

Main parts check

Temperature sensor checking

Disconnect the temperature sensor from PCB, measure the resistance value with a tester.

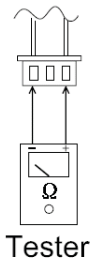


Fig. 53 – Tester

Temperature Sensors.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Compressor discharge temp.(T5) sensor.

Measure the resistance value of each winding by using the multi-meter.

APPENDIX

Appendix 1

Table 28— Temperature Sensor Resistance Value Table for T1,T2,T3,T4 (t--K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

Appendix 2

Table 29— Temperature Sensor Resistance Value Table for T5 (t--K)

°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	542.7	20	68	68.66	60	140	13.59	100	212	3.702
-19	-2	511.9	21	70	65.62	61	142	13.11	101	214	3.595
-18	0	483	22	72	62.73	62	144	12.65	102	216	3.492
-17	1	455.9	23	73	59.98	63	145	12.21	103	217	3.392
-16	3	430.5	24	75	57.37	64	147	11.79	104	219	3.296
-15	5	406.7	25	77	54.89	65	149	11.38	105	221	3.203
-14	7	384.3	26	79	52.53	66	151	10.99	106	223	3.113
-13	9	363.3	27	81	50.28	67	153	10.61	107	225	3.025
-12	10	343.6	28	82	48.14	68	154	10.25	108	226	2.941
-11	12	325.1	29	84	46.11	69	156	9.902	109	228	2.86
-10	14	307.7	30	86	44.17	70	158	9.569	110	230	2.781
-9	16	291.3	31	88	42.33	71	160	9.248	111	232	2.704
-8	18	275.9	32	90	40.57	72	162	8.94	112	234	2.63
-7	19	261.4	33	91	38.89	73	163	8.643	113	235	2.559
-6	21	247.8	34	93	37.3	74	165	8.358	114	237	2.489
-5	23	234.9	35	95	35.78	75	167	8.084	115	239	2.422
-4	25	222.8	36	97	34.32	76	169	7.82	116	241	2.357
-3	27	211.4	37	99	32.94	77	171	7.566	117	243	2.294
-2	28	200.7	38	100	31.62	78	172	7.321	118	244	2.233
-1	30	190.5	39	102	30.36	79	174	7.086	119	246	2.174
0	32	180.9	40	104	29.15	80	176	6.859	120	248	2.117
1	34	171.9	41	106	28	81	178	6.641	121	250	2.061
2	36	163.3	42	108	26.9	82	180	6.43	122	252	2.007
3	37	155.2	43	109	25.86	83	181	6.228	123	253	1.955
4	39	147.6	44	111	24.85	84	183	6.033	124	255	1.905
5	41	140.4	45	113	23.89	85	185	5.844	125	257	1.856
6	43	133.5	46	115	22.89	86	187	5.663	126	259	1.808
7	45	127.1	47	117	22.1	87	189	5.488	127	261	1.762
8	46	121	48	118	21.26	88	190	5.32	128	262	1.717
9	48	115.2	49	120	20.46	89	192	5.157	129	264	1.674
10	50	109.8	50	122	19.69	90	194	5	130	266	1.632
11	52	104.6	51	124	18.96	91	196	4.849			
12	54	99.69	52	126	18.26	92	198	4.703			
13	55	95.05	53	127	17.58	93	199	4.562			
14	57	90.66	54	129	16.94	94	201	4.426			
15	59	86.49	55	131	16.32	95	203	4.294			
16	61	82.54	56	133	15.73	96	205	4.167			
17	63	78.79	57	135	15.16	97	207	4.045			
18	64	75.24	58	136	14.62	98	208	3.927			
19	66	71.86	59	138	14.09	99	210	3.812			

Appendix 3

Table 30— Temperature Sensor Resistance Value Table

C	10	11	12	13	14	15	16	17	18	19	20	21	22
F	48	50	52	54	56	58	60	62	64	66	68	70	72
C	23	24	25	26	27	28	29	30	31	32	33	34	35
F	74	76	78	80	82	84	86	88	90	92	94	96	98

IPM continuity check

Turn off the power, let the large capacity electrolytic capacitors discharge completely, and dismount the IPM. Use a digital tester to measure the resistance between P and UVWN; UVW and N.

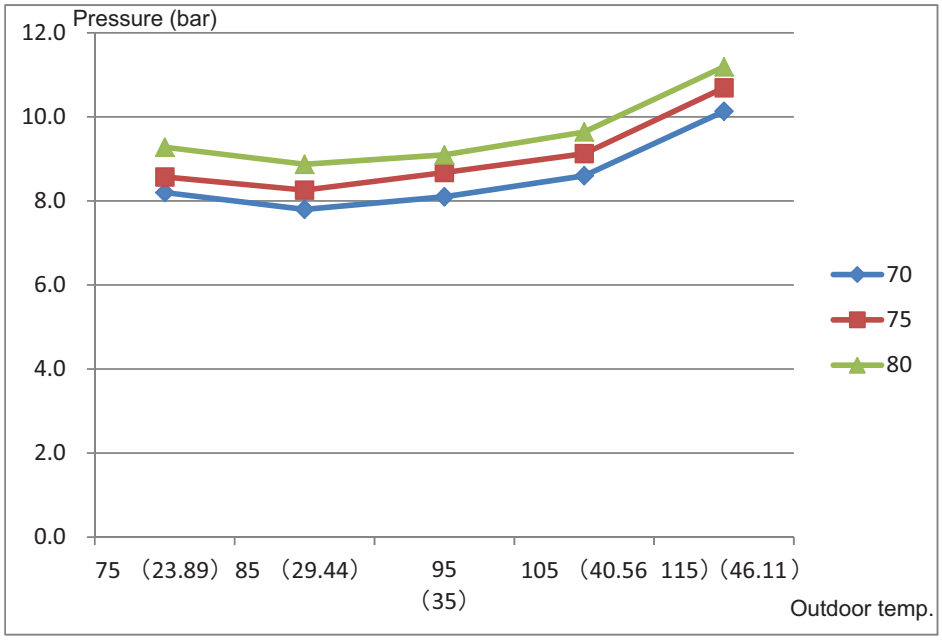
Table 31— IPM continuity check

Digital Tester		Normal Resistance value	Digital Tester		Normal Resistance value
(+) Red	(-) Black		(+) Red	(-) Black	
P	N	∞ (Several M Ω)	U	N	∞ (Several M Ω)
	U		V		
	V		W		
	W		(+) Red		

Pressure on Service Port

Table 32—Cooling Chart

°F °C	Indoor Temp.	Outdoor temp.				
		75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)
BAR	70	8.2	7.8	8.1	8.6	10.1
BAR	75	8.6	8.3	8.7	9.1	10.7
BAR	80	9.3	8.9	9.1	9.6	11.2
PSI	70	119	113	117	125	147
PSI	75	124	120	126	132	155
PSI	80	135	129	132	140	162
MPA	70	0.82	0.78	0.81	0.86	1.01
MPA	75	0.86	0.83	0.87	0.91	1.07
MPA	80	0.93	0.89	0.91	0.96	1.12



Heating Chart:

Table 33—Heating chart

°F/°C	Indoor temp.	Outdoor temperature				
		57 (13.89)	**47 (8.33)**	**37 (2.78)**	**27 (-2.78)**	**17 (-8.33)**
BAR	55	30.3	28.5	25.3	22.8	20.8
BAR	65	32.5	30.0	26.6	25.4	23.3
BAR	75	33.8	31.5	27.8	26.3	24.9
PSI	55	439	413	367	330	302
PSI	65	471	435	386	368	339
PSI	75	489	457	403	381	362
MPA	55	3.03	2.85	2.53	2.28	2.08
MPA	65	3.25	3.00	2.66	2.54	2.33
MPA	75	3.38	3.15	2.78	2.63	2.49

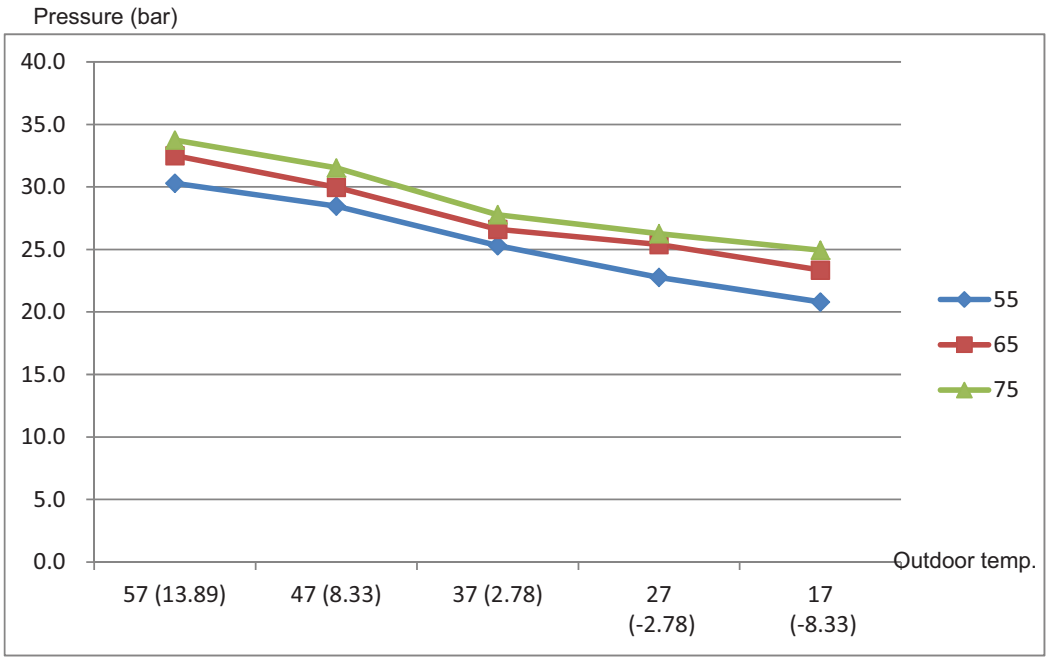
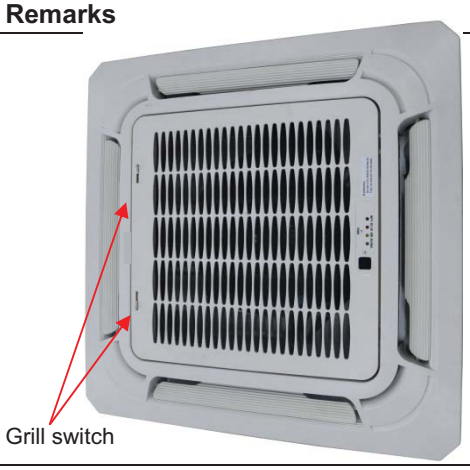
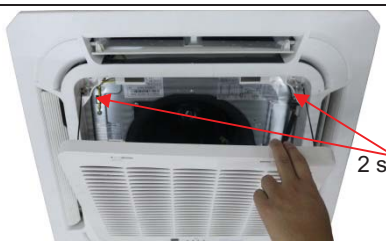
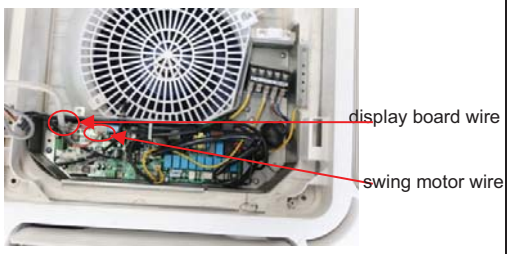
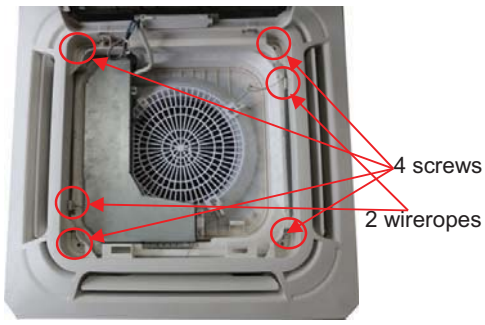
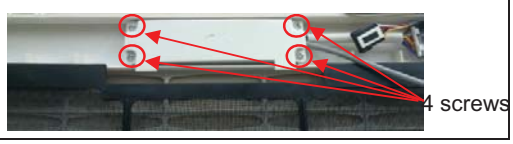
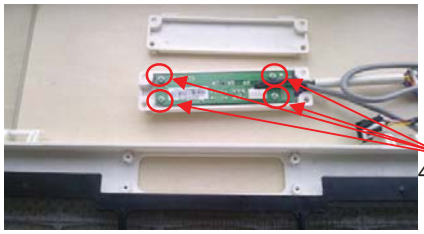
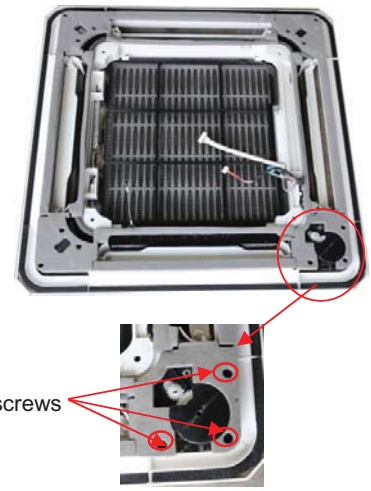
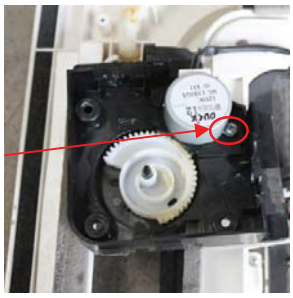
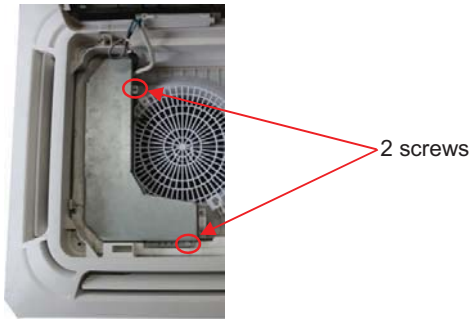
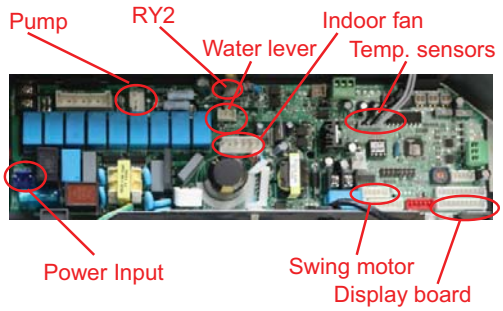
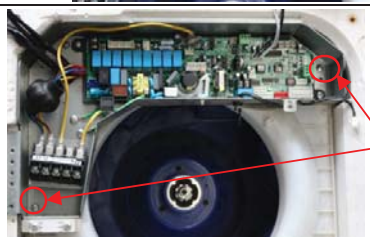
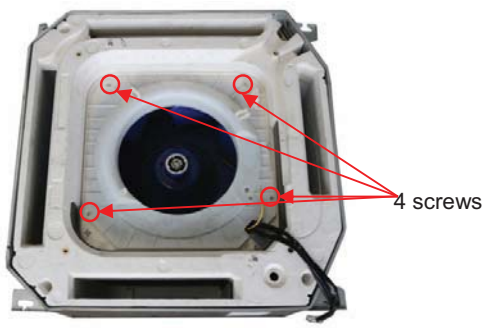


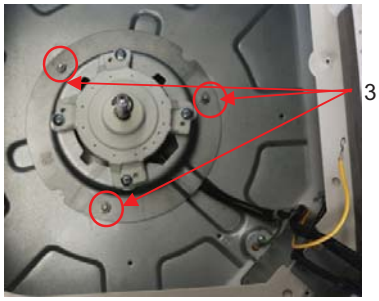
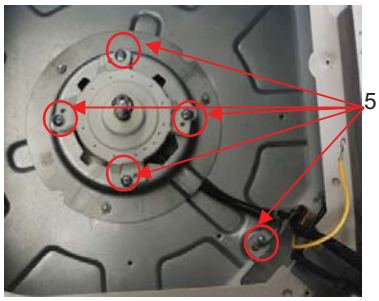
Fig. 54 – Pressure Bar

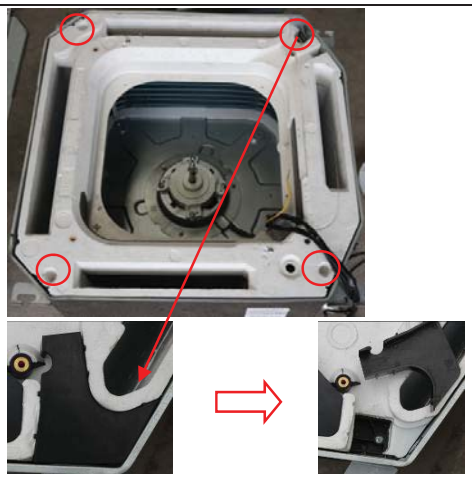
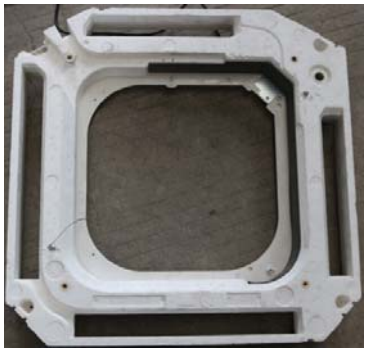
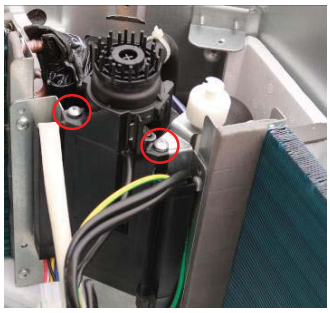
DISASSEMBLY INSTRUCTIONS CASSETTE INDOOR UNIT

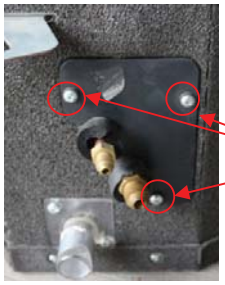
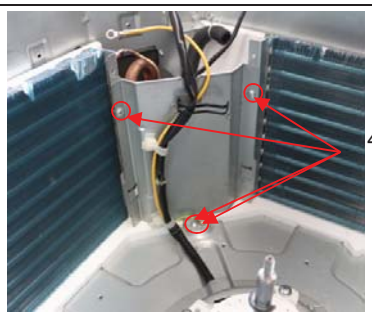
No.	Parts name	Procedures	Remarks
1	**Remove the filter**	**3) Open the grille**	
		4) Remove the filter **Note**: the filter is easy to be damaged, be careful when removing it.	
2	**Remove the panel**	**4) Open the grille**	Repeat the operation of step1 of No.1
		5) Remove the grille ● Screw off two screws. ● Disconnect the display board wire and swing motor wire connected to the PCB. ● Remove the grille.	 
		5) Loose the four screws and two wireropes, then the panel can be disassembled.	
3	**Remove the display board**	**1) Open the grille**	Repeat the operation of step1 of No.1
		2) Remove the grille	Repeat the operation of step2 of No.2
		3) Disassemble the display board ● **Remove the display**	

		board cover(4 screws) ● **Remove the display board(4 screws)**	
4	**Remove the swing motor**	**1) Remove the panel**	Repeat the operation of step1,2,3 of No.2
		2) Unscrew the 3 screws to remove the swing motor assy.	
		3) Unscrew 1 screw to remove the swing motor.	
5	**Remove the PCB**	**1) Open the grille**	Repeat the operation of step1 of No.1(No need to remove the panel)
		2) Disassemble the electronic control box cover after remove the 2 screws.	

		3) Pull out all the connection wires to other parts, then the PCB can be replaced.	
		4) There are 2 buckles fixing the PCB. To draw out the PCB, you should open them.	
6	**Remove the electronic control box**	**1) Open the grille**	Repeat the operation of step1 of No.1(No need to take down the panel)
		2) Remove the electronic control box cover	Repeat the operation of step 2 of No.5
		3) Pull out all the plugs or connectors connected to the electronic control box	
		4) Remove the electronic control box Remove the 2 screws to disassemble the electronic control box	 
7	**Remover the fan wheel**	**1) Repeat the operation of No.5**	
		2) Remove the ventilation ring Release the 4 screws to disassemble it.	

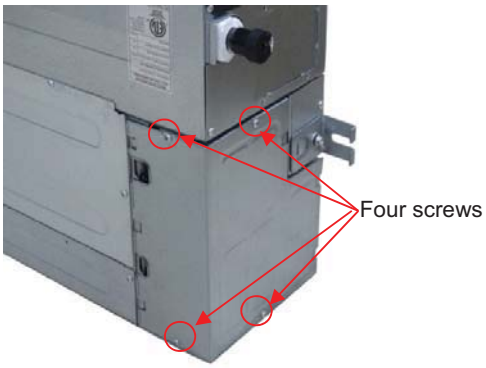
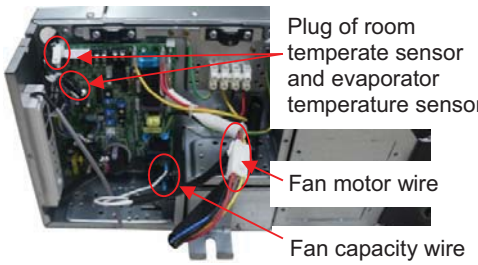
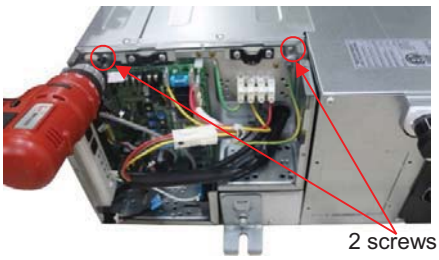
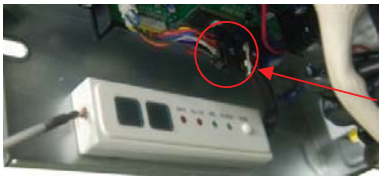
			
		3) Remove the fixing nut to disassemble the fan wheel	
		4) Pull out the fan wheel	
8	Remove the fan motor	1) Repeat the operation of No.6	
		2) Remove the fixing board of fan motor wire	
		3) Remove the 5 screws to disassemble the fan motor	
9	Remove the water collecting	6) Remove the panel	Repeat the operation of No.2
		7) Remove the electronic control box	Repeat the operation of No.6

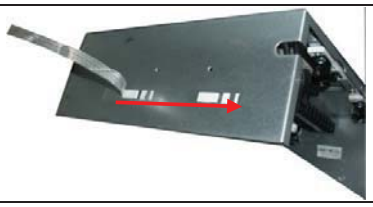
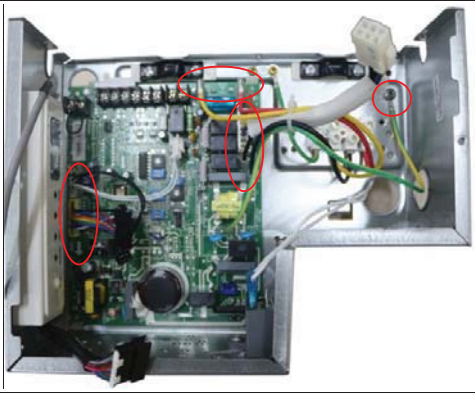
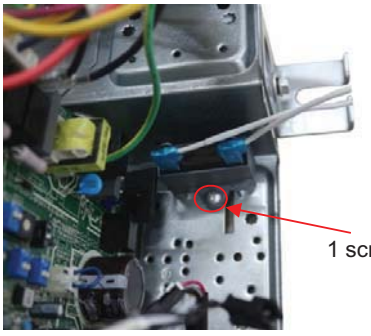
	assembly	8) Unscrew the 4 screws inside 4 holes (1 is under a protection cover) to remove the water collecting assembly.	
		9) Take out the water collecting assembly	
10	Remove the draining pump	1) Remove the panel	Repeat the operation of No.2
		2) Remove the electronic control box	Repeat the operation of No.6
		3) Remove the water collecting assembly	Repeat the operation of No.9
		4) Disconnect the drain pipe.	 
		5) Remove 2 screws to remove the pump supporter. Be careful of the connection wires.	

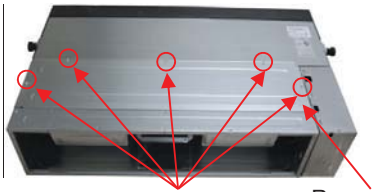
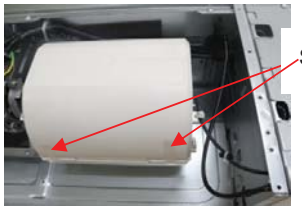
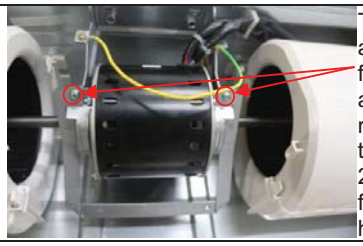
			
		6) There are 2 screws under the supporter to fixing the pump. Release them to take the pump out of the supporter.	 
11	Remove the evaporator	1) Remove the water collecting assembly	Repeat the operation of No.9
		2) Remove the seal board of evaporator	
		3) Remove the evaporator fixing board	
		4) Remove the evaporator fixing clamps to disassemble the evaporator.	

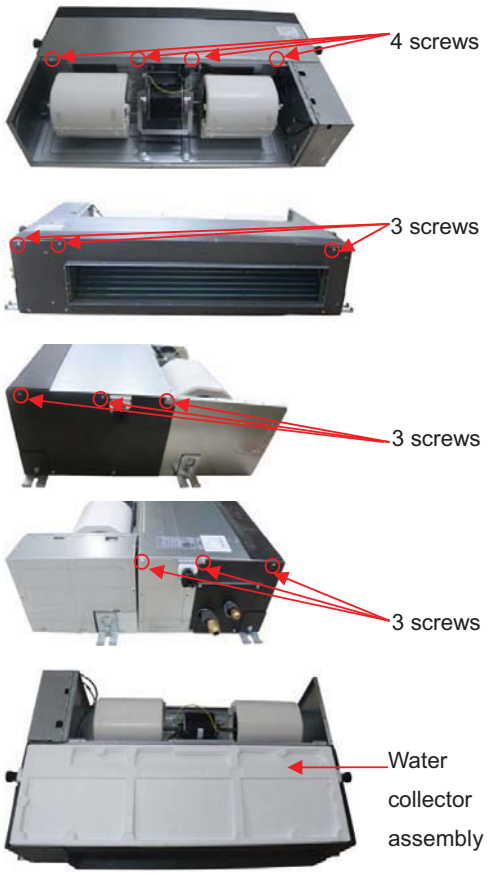
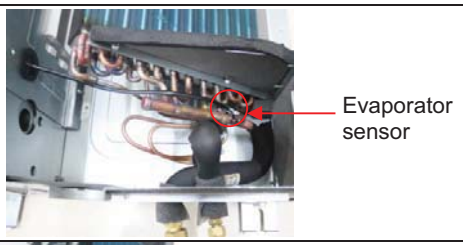
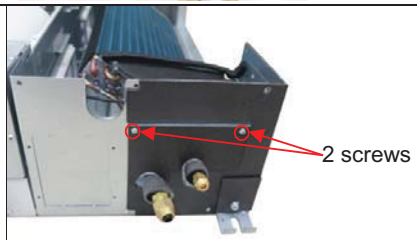
DISASSEMBLY INSTRUCTIONS DUCTED INDOOR UNIT

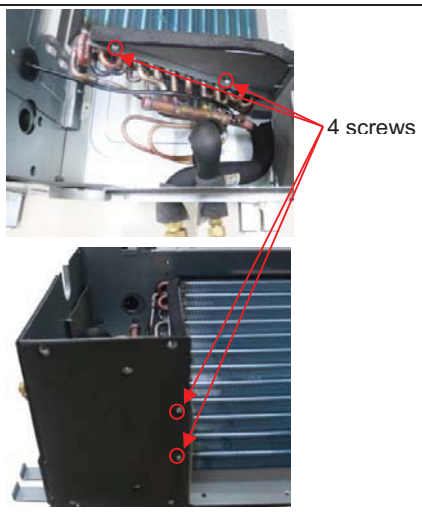
NOTE: This part is for reference, the photos may differ slightly from your machine.

No.	Parts name	Procedures	Remarks
1	Remove the electronic control box	1) Unscrew the screws to remove the cover of electronic control box	
		2) Disconnect the fan motor wire, fan capacity wire, room temperature sensor wire and evaporator temperature sensor wire	
		3) Unscrew the screws to remove the electronic control box	
2	Remove the display board	1) Remove the cover of electronic control box	Repeat the operation of step1 of No1
		2) Disconnect the display board wire connected to PCB	
		3) Remove the sticker	

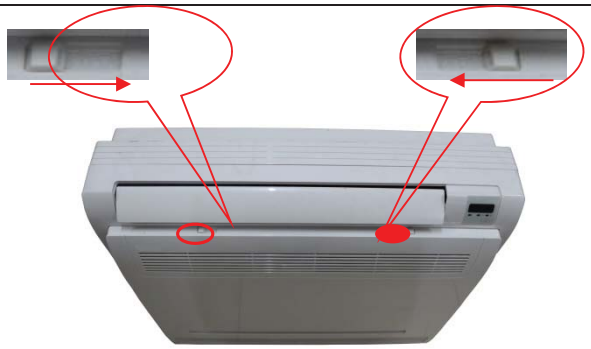
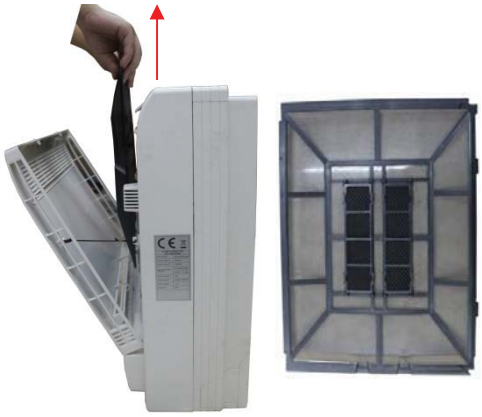
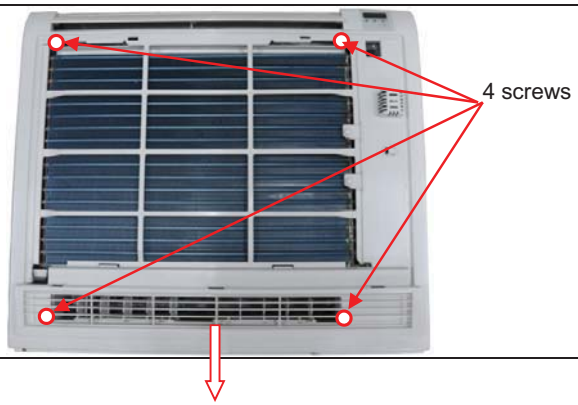
		3）Move the display board according to the arrow direction to disassemble it.	
3	Remove the PCB	1) Remove the cover of electronic control box	Repeat the operation of step1 of No1
		1) Pull out all the plugs or connectors connected to the PCB and remove the ground wire after remove the screw.	
		2) Remove the PCB from the electronic control box	  Press the four fixing holders from four corners to remove the PCB  PCB
4	Remove the fan capacitor	1) Remove the cover of electronic control box	Repeat the operation of step1 of No1
		2) Disconnect the fan capacity wire.	Repeat the operation of step2 of No1
		3) Unscrew the screw to remove it.	 1 screw

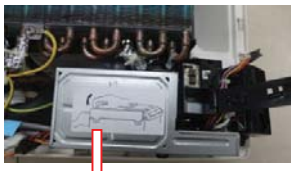
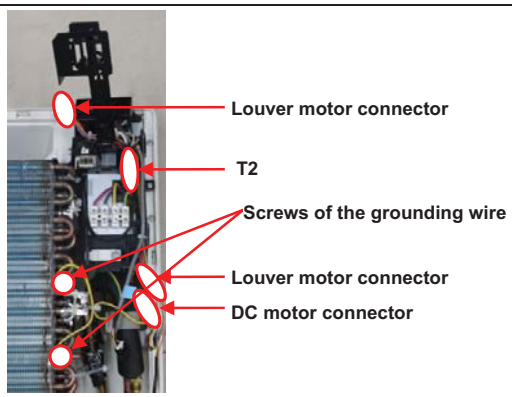
5	Remove the fan motor	1) Unscrew the fixing screws to remove the rear cover board	
		2) Unscrew the fixing screws to remove the rear beam	 Total four screws at the left side and right side
		3) Remove room temperature sensor	
		4) Remove the sticker	
		5) Remove the below volute shell	 Press the clips to take off the volute shell
		6) Remove the fan motor wire from the electronic control box	Refer the operation of step2 of No.1
		7) Disassemble the fan motor fixing clamps to remove the fan motor assembly and fan wheel assembly	
		8) Disassemble the fan wheels, then you can remove the fan motor	

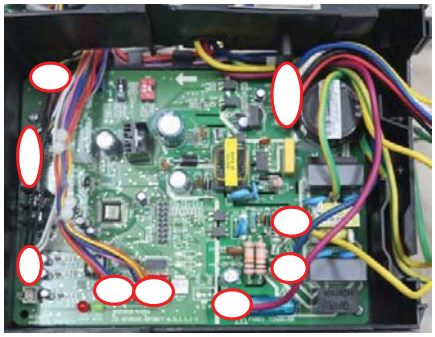
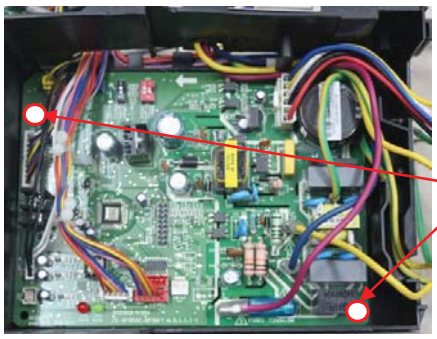
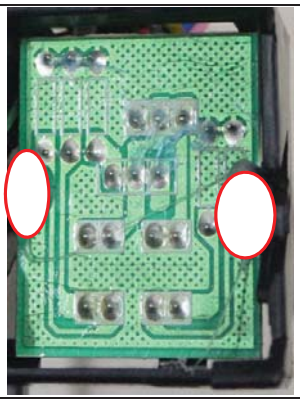
6	**Remove the water collector assembly**	**1) Remove the rear cover board**	Repeat the operation of step1 of No.5
		2) Unscrew the screws to remove the water collector assembly	
7	**Remove the evaporator**	**1) Remove the water collector**	Repeat the operation of No.6
		2) Remove the evaporator sensor	
		3) Remove the pipe clamp board	

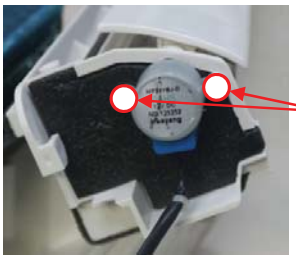
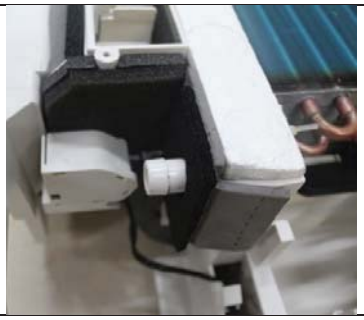
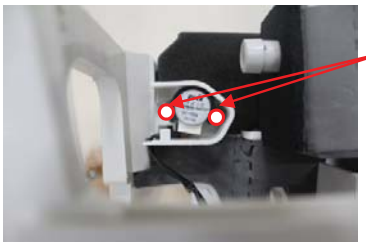
		4) Remove the evaporator support board	
		5) Unscrew the fixing screws to remove the evaporator	

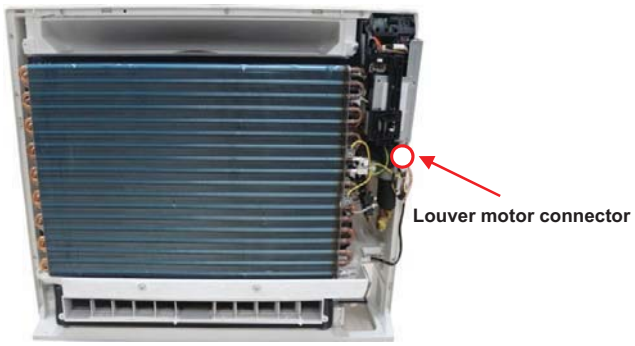
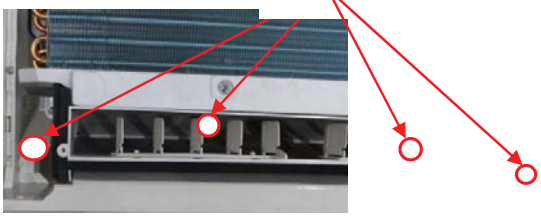
DISASSEMBLY INSTRUCTIONS FLOOR CONSOLE INDOOR UNIT

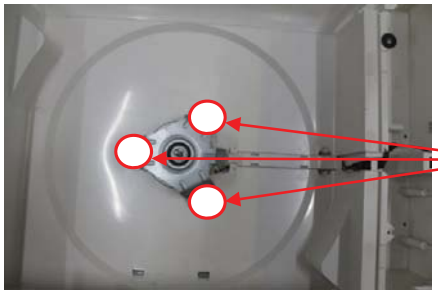
<table>
<tr><th>No.</th><th>Parts name</th><th>Procedures</th><th>Remarks</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Remove the Filter</td><td>1) Slide the two stoppers on the left and right sides to open the front panel</td><td> 
</td></tr>
<tr><td>2) Remove the filter.</td><td>  </td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Remove the electronic control box</td><td rowspan="2">1) Remove the air front panel</td><td>● Open the front panel
Repeat the operation of step1 of No.1</td></tr>
<tr><td>● Remove the string.
 
● Allowing the front panel to fall forward will enable you to remove it.</td></tr>
<tr><td>2) Remove the filter.</td><td>Repeat the operation of step 2 of No.1</td></tr>
<tr><td>3) Remove four fixing screws to remove the panel frame assembly</td><td> 
</td></tr>
</table>

			
		4) Remove the installation plate of electric parts	 
		5) Remove the fixing board of electronic control box	 
		6) Disconnect the DC motor wire, 2 louver motor wires, evaporator coil temperature sensor(T2) wire, and two grounding wire (yellow-green) to remove the electronic control box	
3	Remove the PCB	1) Take out the electronic control box from the body and remove its cover	Repeat the operation of step1~ step6 of No2.

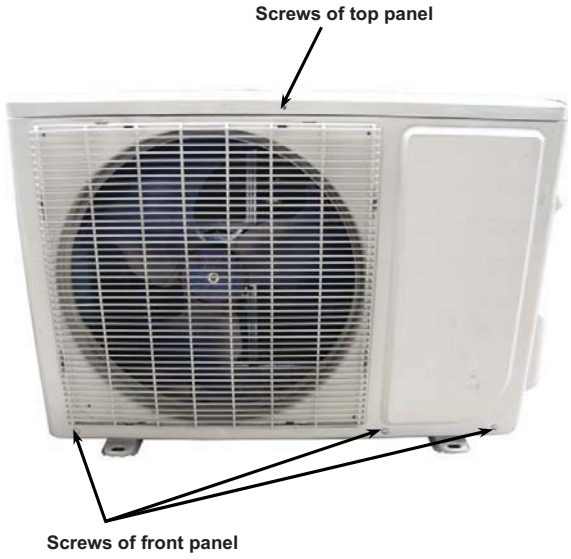
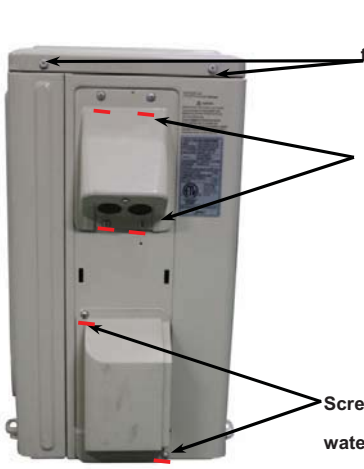
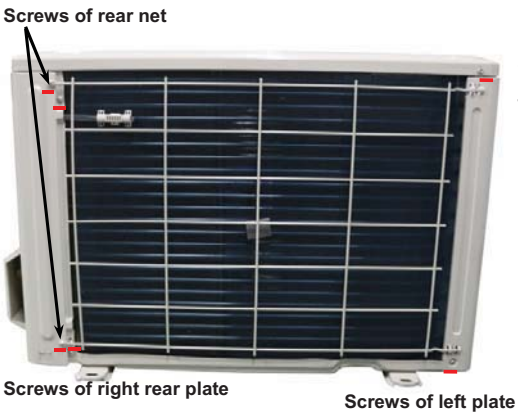
		2) **Disconnect all the wires of plugs connected to the PCB**	
		3) **Remove two fixing screws to remove the PCB**	
4.	**Remove the display board**	1) **Remove the electronic control box**	Repeat the operation of step1~step of No2.
		2) **Remove the fixing glue to remove the display board**	
5	**Remove the switch board**	1) **Remove the electronic control box**	Repeat the operation of step1~step of No2.
		2) **Remove the fixing glue to remove the display board**	
7	**Remove the air outlet grille assembly**	1) **Remove the front panel assembly and the panel frame assembly**	Repeat the operation of step1, step2 and step3 of No 2.

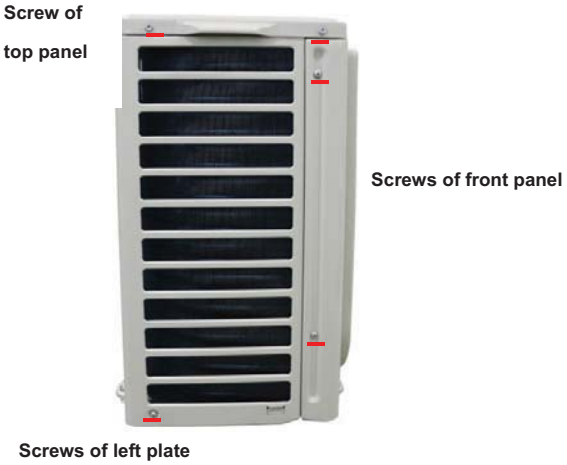
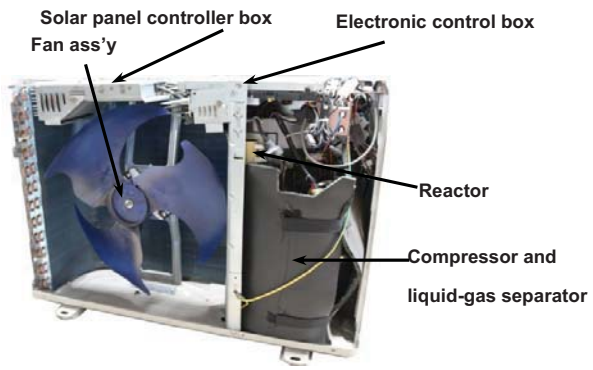
		2) Remove the 1 fixing screw to remove air outlet grille assembly	
		3) Disconnect louver motor wire	
8	**Remove the louver motor of air outlet assembly**	**1) Remove the air outlet grille assembly**	Repeat the operation of No.7 to remove the air outlet grille assembly
		2) Screw off the screws to remove the motor	
9	**Remove the louver motor of the water collector**	**1) Remove the front panel assembly and the panel frame assembly**	Repeat the operation of step1, step2 and step3 of No 2.
		2) Remove the cover of louver motor	
		3) Unscrew the screws to remove the motor	
10	**Remove the water collector**	**1) Remove the front panel assembly and the panel frame assembly**	Repeat the operation of step1, step2 and step3 of No 2.

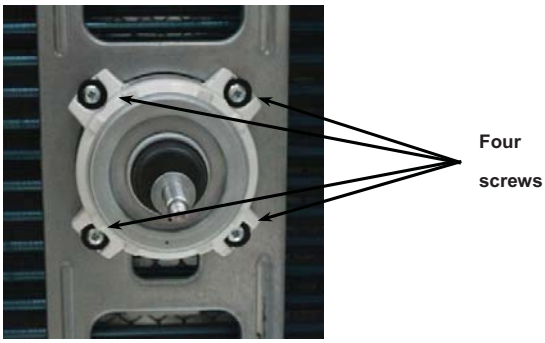
		2) Disconnect louver motor wire	
		3) Remove 4 fixing screws to disassemble the water collector	   
11	**Remove the evaporator assembly**	**1) Remove the electronic control box**	Repeat the operation of No.2 to remove the electronic control box
		2) Remove the air outlet grille assembly	Repeat the operation of No.7 to remove the air outlet grille assembly
		3) Remove the evaporator sensor and release the pipe strap.	

		4) Remove the evaporator assembly	
12	**Remove the centrifugal fan**	**1) Remove the electronic control box**	Repeat the operation of No.2 to remove the electronic control box
		2) Remove the air outlet grille assembly	Repeat the operation of No.7 to remove the air outlet grille assembly
		3) Remove four fixing screws to remove the ventilation assembly	 Each side has two screws
		4) **Remove the hex nut fixing the fan to remove the fan.**	
13	**Remove the fan motor**	**1) Remove the centrifugal fan**	Repeat the operation of No.12 to remove the centrifugal fan
		2) Remove the fan motor after unfastening three fixing screws.	 3 screws

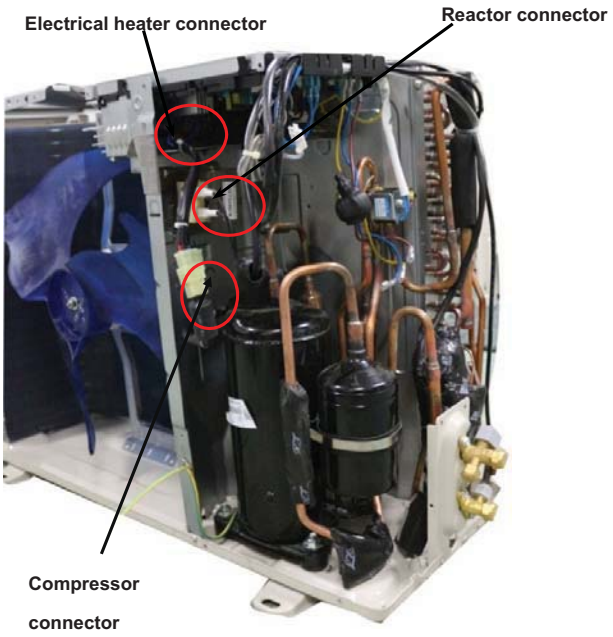
DISASSEMBLY INSTRUCTIONS OUTDOOR UNIT

No.	Part name	Procedures	Remarks
1	Panel plate	How to remove the panel plate. 1) Stop operation of the air conditioner and turn “OFF” the power breaker. 2) Refer to the right side photos, find out the fixing screws of the panels. 3) Remove the screws of top panel and remove the top panel. 4) Remove the screws of the front panel and then remove the front panel. 5) Remove the screws of the right side plate and remove the right side plate.	  

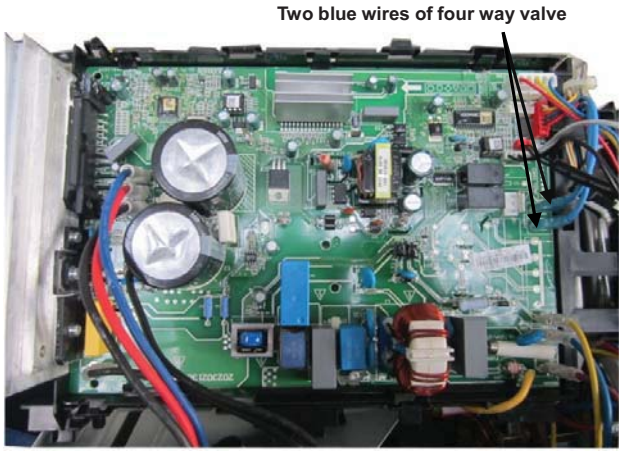
			
2	Fan ass'y	How to remove the fan ass'y. 1) After remove the panel plate following procedure 1, remove the hex nut fixing the fan and then remove the fan. 2) Unfix the hooks and then open the electronic control box cover.	   

		3) Disconnect the connector for fan motor from the electronic control board. 4) Remove the four fixing screws of the fan motor. 5) Then remove the fan motor.	Fan motor connector   Four screws
3	Electrical parts	How to remove the electrical parts. 1) After finish work of item 1 and item 2, remove the two connectors for the compressor and electrical heaters.	Solar panel controller box Electronic control box 

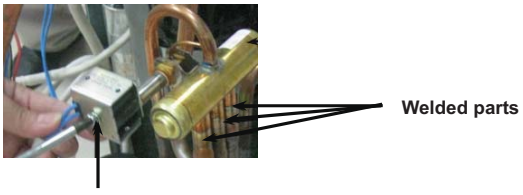
2) Release the connector of the reactor.



3) Pull out the two blue wires connected with the four way valve.



4) Pull out connectors of the compressor top temp. sensor, condenser coil temp. sensor (T3),outdoor ambient temp. sensor (T4) and discharge temp. sensor (T5).

		5) Remove the ground wires. 6) Remove the power supply wires (L1, L2, S). 7) Then remove the electronic control box.	
4	Four-way valve	How to remove the four-way valve. 1) Perform work of item 1, 2, 3. 2) Recover refrigerant from the refrigerant circuit. 3) Remove the screw of the coil and then remove the coil. 4) Detach the welded parts of four-way valve and pipe. 5) Then the four-way valve ass'y can be removed	The picture of four-way valve may be different from the one on your side.  

5	Compressor	How to remove the compressor. 1) After perform work of item1,2,3. 2) Remove the discharge pipe and suction pipe with a burner. 3) Remove the hex nuts and washers fixing the compressor on bottom plate. 4) Lift the compressor from the base pan assembly.	

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